A window open on the world

The UNESCO Courier

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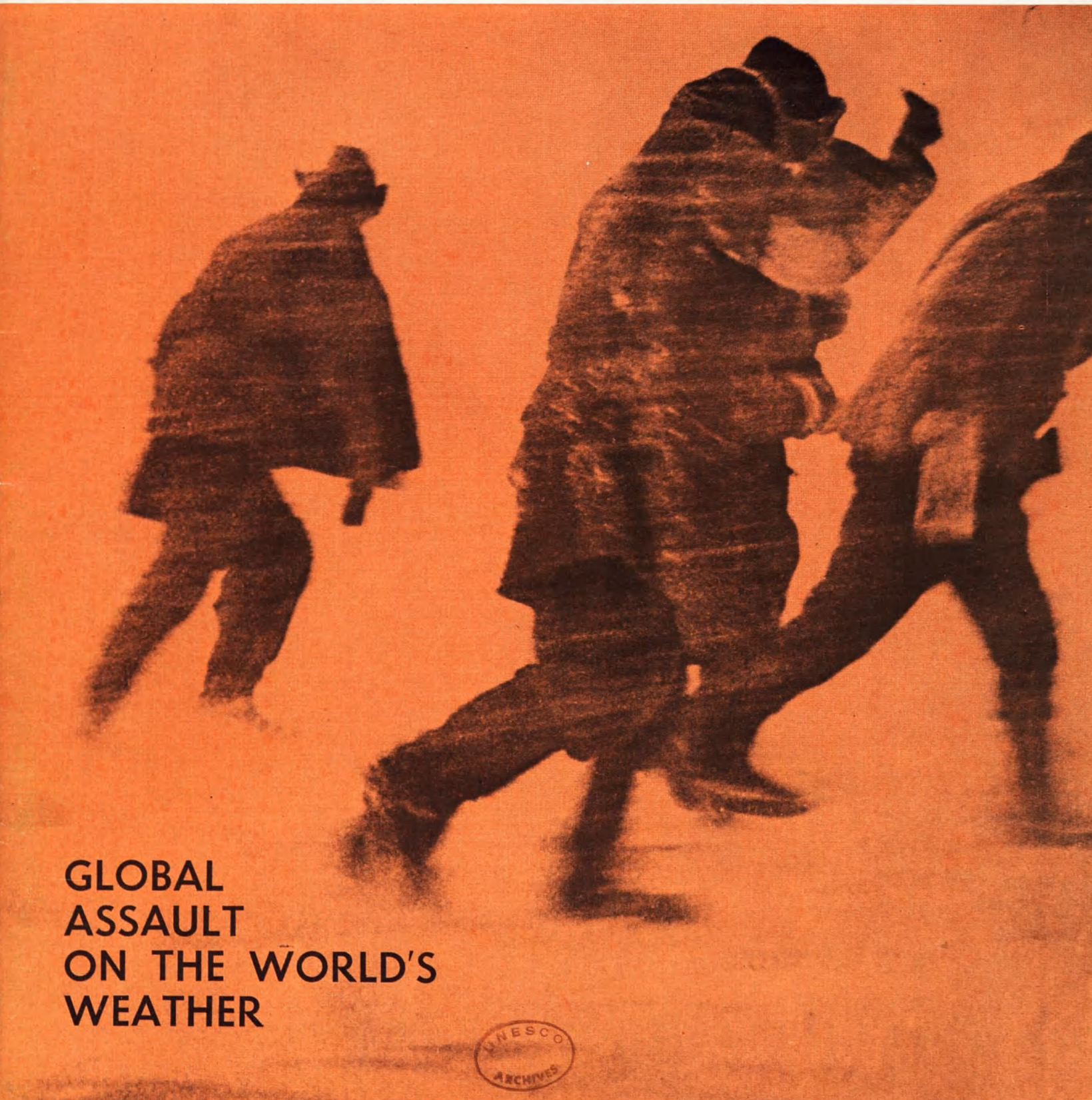
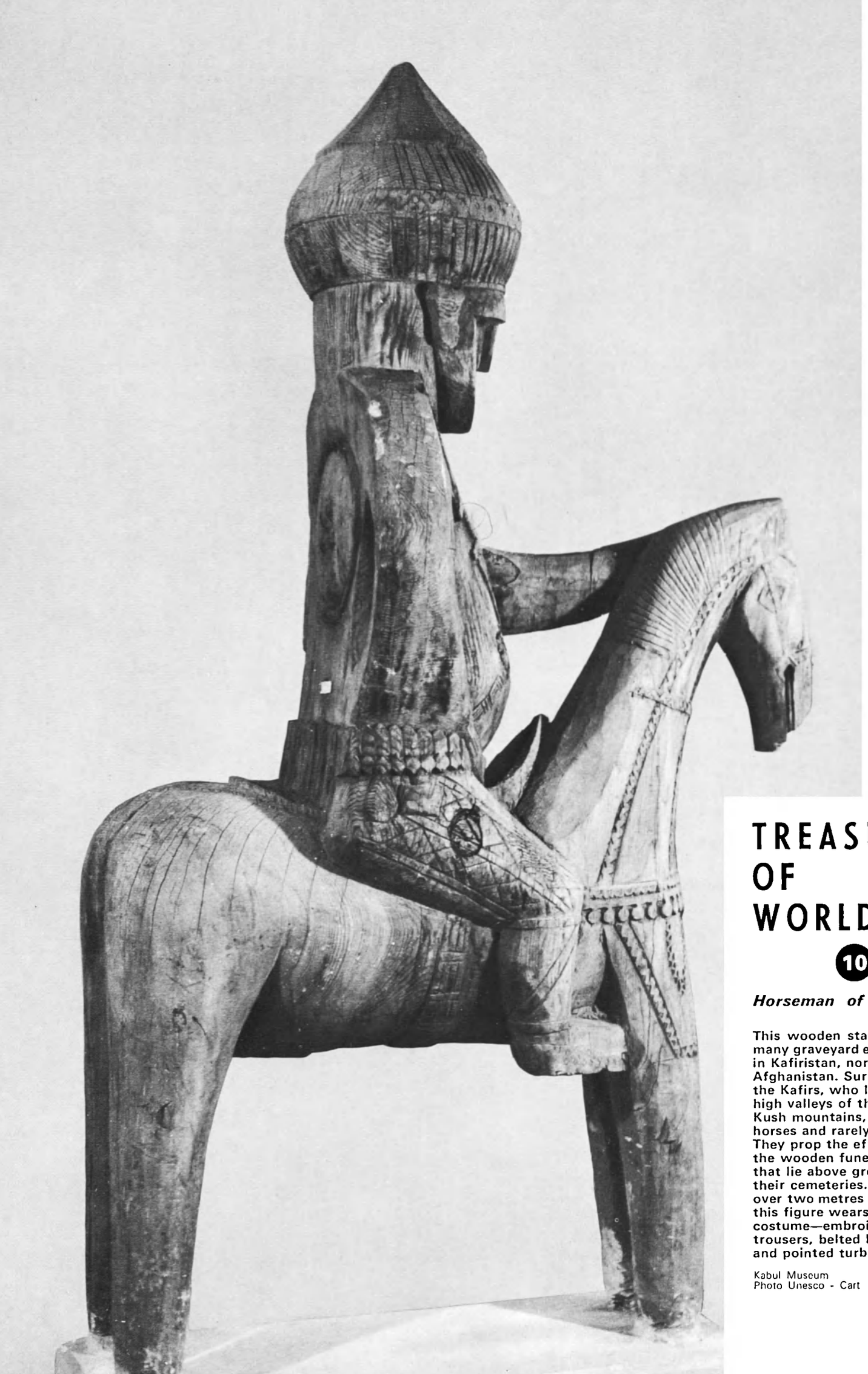


GLOBAL ASSAULT ON THE WORLD'S WEATHER

UNESCO ARCHIVES



TREASURES OF WORLD ART

10

Horseman of Kafiristan

This wooden statue is one of many graveyard effigies found in Kafiristan, northeastern Afghanistan. Surprisingly, the Kafirs, who live in the high valleys of the Hindu Kush mountains, keep no horses and rarely see them. They prop the effigies against the wooden funeral caskets that lie above ground in their cemeteries. Standing over two metres (6½ ft.) high, this figure wears a traditional costume—embroidered trousers, belted blouse and pointed turban.

Kabul Museum
Photo Unesco - Cart

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Photo © APN — A. Varfolemeev

Cover photo

The launching of the world's first weather satellite in 1960 opened a new era in meteorology. Weather forecasting and exploration of the atmosphere can now be based on data obtained promptly and on a truly global scale. But even today only one-quarter of the surface of the globe has enough meteorological stations. To fill the gaps in the present weather observation network, the World Meteorological Organization is planning a bold new adventure in international co-operation—the World Weather Watch.

UNESCO ARCHIVES

TELEVISION FOR THE PRE-SCHOOL CHILD

by Henry R. Cassirer

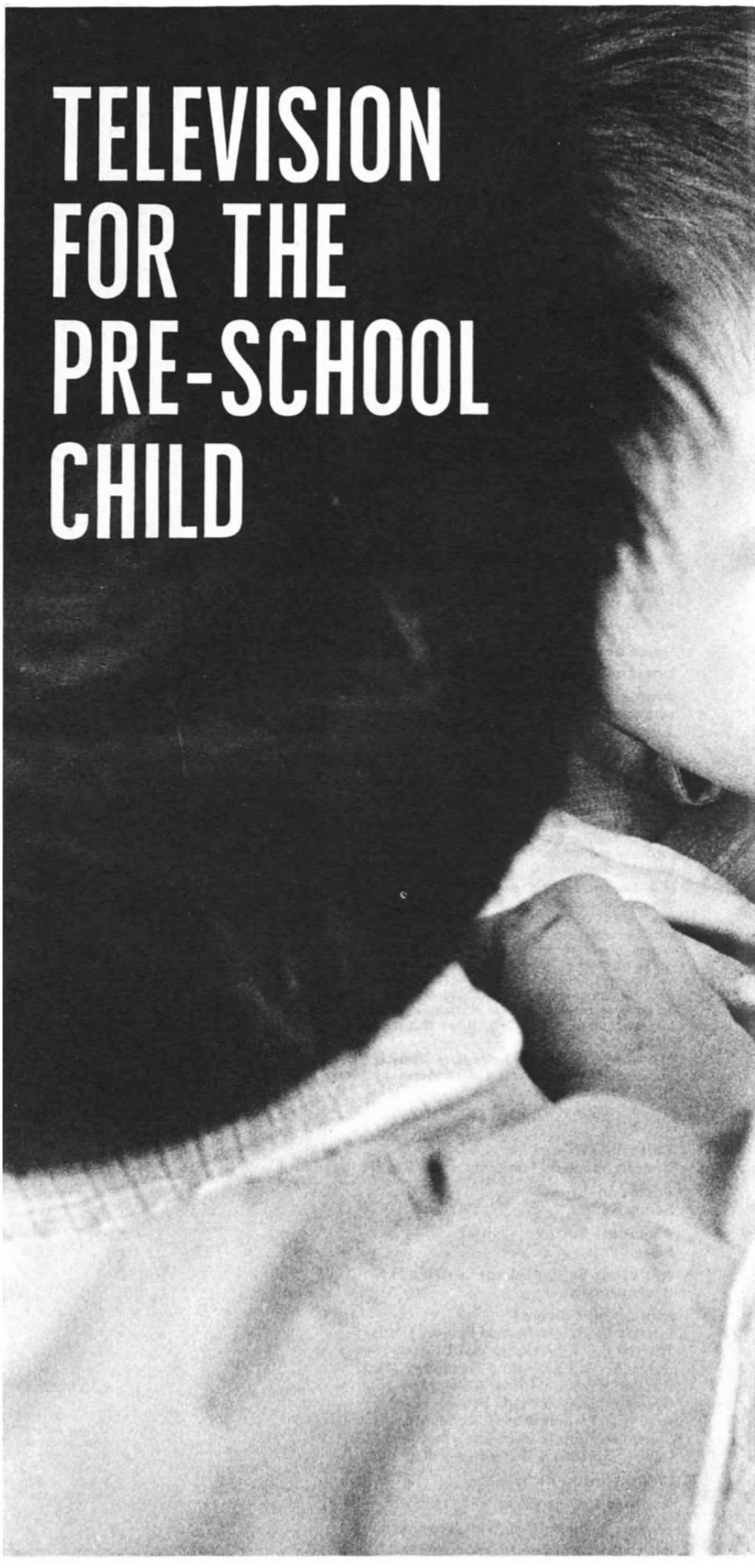


Photo © IPN - Jean Suquet - Pierre Allard

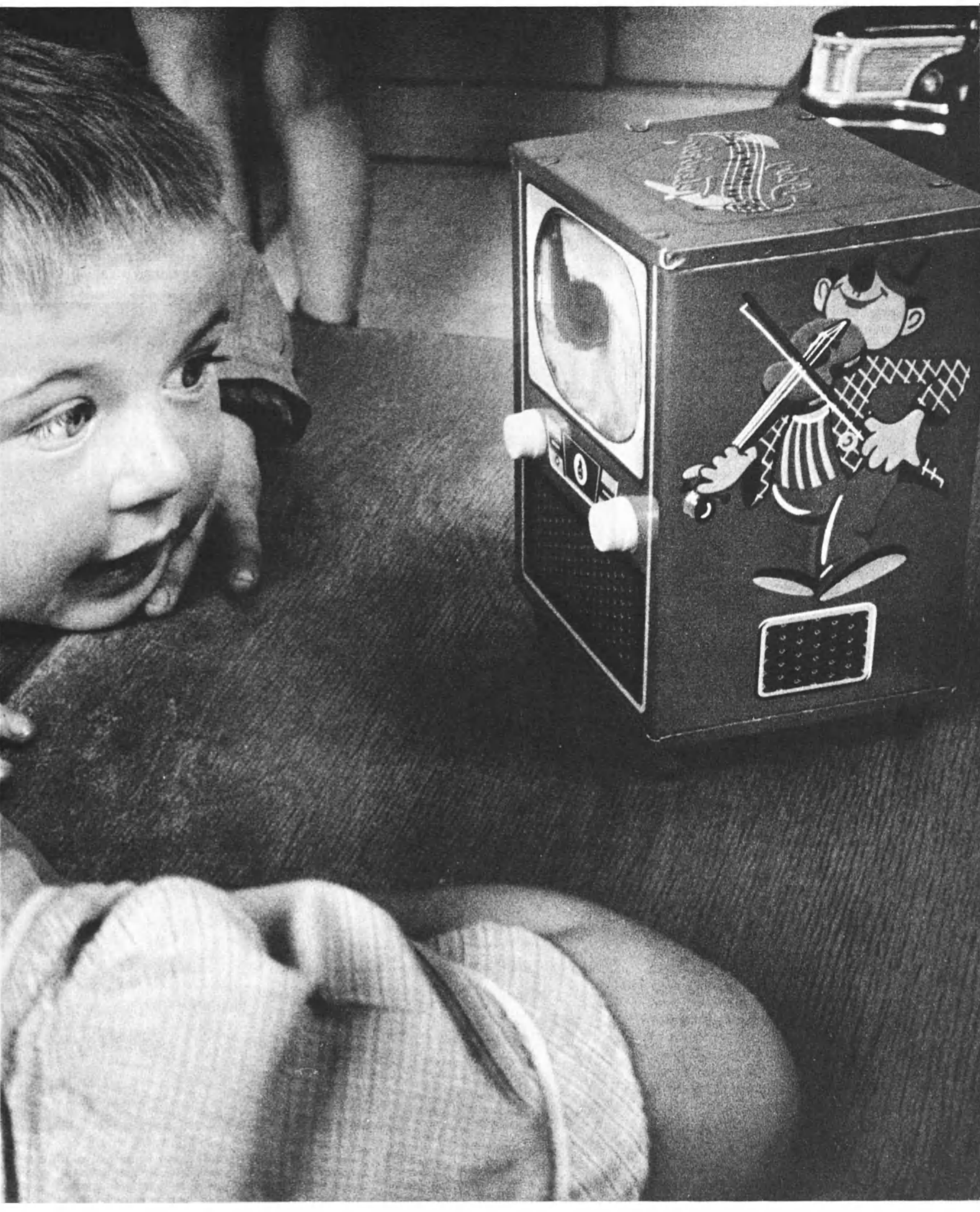
IN Venezuela and Japan, in Czechoslovakia and the United States, special programmes are broadcast by television stations for children in kindergartens. In Britain tiny tots are asked to "Watch With Mother", while in New Mexico, in the United States, where there are no public kindergartens, the "TV Kindergarten" takes their place in many a home and community. Pre-school children tend to watch television whenever there is a receiver in the home, and educators are becoming increasingly aware of the importance of the television experience in the lives of young children.

But why should special efforts be made to reach children between the ages of two and six with television programmes?

Experience indicates two types of

CONTINUED ON PAGE 6

HENRY R. CASSIRER *is in charge of the educational use of mass media in Unesco's Department of Mass Communication. He is the author of "Television Teaching Today" (Unesco, 1960; price: $3.00, 15/-stg.).*



Wonderland through the 'looking-glass'

answers to this question. On the one hand, it is argued that in countries which offer massive television programmes by day and night, children inevitably are attracted to the screen and see many shows either not suited to their age or of doubtful value. The moving image on the TV screen exerts a fascination quite independent of the content of programmes. This frequently tempts parents to use TV as a baby sitter; they urge their children to "watch the tele" in order to have them out of the way when they would like to get on with the housework. Under these circunmstances, it is particularly valuable to present programmes carefully prepared and adapted to the young ones in order to meet their hunger for TV and to give them a sense of values and discrimination with respect to the majority of unsuitable shows.

Those who argue this way unquestionably have the child's interest in mind; but this is essentially a negative approach: let's have TV programmes for the young ones, because we can't keep them away from television anyway.

A more fundamental reasoning stresses the important positive contribution which television is able to make in order to "develop the world within the child and familiarize it with the world around", as the producers of one series of programmes put it. This approach sees in television one of the tools to attack one of the basic sources of social inequality in our time, the great disparity among children of school age between those who come from well-to-do homes and a cultured background and those who bring with them the social and cultural deprivation of their home.

Rather than difference in intelligence, it is difference in background which gives rise to the greatest problems in elementary education, prevents children from rising above the social status of their parents, and deprives them of the equality of opportunity through education—one of the fundamental objectives of the Universal Declaration of Human Rights.

The underprivileged suffer handicaps of both body and mind in the race through life. "Children need certain basic knowledge to profit even from kindergarten; children lacking this knowledge—certain words, ideas, habits— fall behind in their work and may take as long as five years to complete the third grade", stated a leading educator from one of the cities of the American Midwest.

Her point of view is shared all around the world. Children who come to school with a very limited vocabulary and with no idea of the way nature and the man-made world look beyond their restricted experience in urban slums or on a poverty-stricken farm, are unable to benefit from education to the same degree as children who have been more widely exposed to social and cultural experiences. It is here that the audiovisual media of communication, and especially television, become significant forces for the democratization of opportunities.

It is generally recognized that inborn intelligence is no more than a potential

Photo © Rapho - Limot

In the past decade special efforts have been made to reach children between the ages of two and six with television programmes. Well-planned programmes have proved to be effective helpers for the kindergarten teacher, and regular use is made of them in some schools.

to be cultivated. Without stimulation and education, particularly during the early formative years, such an intelligence is lost for the future. There is need, therefore, for a systematic educational programme for pre-school children and a more intensive effort by both parents and educational institutions; television can effectively assist such a programme.

While the basic objectives of pre-school education are similar in most countries, the degree to which such education is carried by the home or the kindergarten varies not only (or perhaps mainly) between nations, but primarily between social classes and conditions of cultural environment. The role of television must thus equally vary in different conditions.

In Venezuela the Audio Visual Centre of the Ministry of Education produces a programme entitled *En el Jardin de Infancia.* It is transmitted, via the facilities of a commercial station, primarily for use in kindergartens, but also for the benefit of individual families, to raise the standards and opportunities not only in Caracas but equally (or perhaps more particularly) in smaller communities.

The programmes seek to assist kindergarten teachers and parents in activities aimed at developing psychological functions and manual skills of children.

PROGRAMMES are developed in close collaboration with the kindergarten teachers and designed for follow-up action in the group under the guidance of the teacher and through the stimulation of individual activities.

These programmes have been produced continuously since 1960, and many government and private schools in Caracas, as well as in other parts of the country have spontaneously bought receivers so they could benefit from these broadcasts. Their effectiveness is evident from an opinion survey among kindergarten teachers who reported:

"Attendance has become better. Efficiency in manual skills has improved. Vocabulary is richer and more correct. Collaboration... and comprehension are enhanced.

" Television has helped to develop sight and hearing, to exercise memory and to stimulate attention. It has influenced the children's behaviour."

Kindergarten teachers recognize that the programmes are of value not only to the children, but to their own professional training. As so often in educational television, programmes which appear to be designed principally for child audiences are in fact of supreme value in the in-service training of teachers. Typical is a letter from one of the kindergarten teachers to the television teacher in Caracas: "I have learned a good deal thanks to you and your programme. I have taught the children what I learned and now I can teach with enthusiasm. Professionally, I have learned a number of practical and useful techniques for teaching children of pre-school age —techniques which were entirely unknown to me."

MANY of the values noted in these reports from Venezuelan teachers are echoed in other parts of the world. Expansion of the child's vocabulary, broadening of his horizon, stimulation of manual skills and of creative activities are key objectives of kindergarten teaching which can be directly served by television.

In Japan, the public broadcasting corporation, NHK, presents a total of 10 hours 15 minutes per week of programmes specially aimed at children under six years. Commercial stations also have regular programmes for the very young ones. NTV carries some 11 hours a week of broadcasts primarily designed to entertain children through cartoons, quizzes, puppets, audience participation and physical exercises. NET, the commercial educational station, has three programmes of 70 minutes each (with three repeats) per week which follow the official kindergarten curriculum and show to the children fairy tales and folklore from Japan and other countries through dramatic presentations, teach them good manners and etiquette, and enhance rhythmical education through singing and dancing.

In Japan television is popular with both children and teachers. Throughout Japan 82.1% of kindergartens and 71.6% of nursery schools have receivers, and a survey in 1964 indicated that the rate of utilizing NHK programmes was 73.5% in kindergartens and 88.2% in nursery schools.

At a recent regional conference of the National Federation of the Society for Study of Educational Broadcasts at Kittakyushu, I pointedly queried some one hundred kindergarten teachers about the value of using television. Does it not tend to create passivity among children rather than active expression? And does not the relatively poor quality with which scenes of nature and distant places are reproduced on the TV screen provoke distortions in the mind of the child and impair their value?

Both arguments were recognized as valid but by no means inevitable problems. Programme producers are conscious of the importance of stimulating classroom activities. *Captain Do-re-mi-fa*, for instance, a musical show designed for the musical education of children, aims particularly to inspire interest in music and to let children move and play in response to music. Rhythmical education is considered of key importance in Japan for both pre-school and school children, and believed essential for body control and the development of a harmonious personality. Here radio also proves of great value, and many of the kindergartens which receive TV programmes, also use their radio receiver for musical programmes and story telling.

As to the lack of full reality in programmes which show nature and social scenes, it was pointed out that many children in the sprawling cities of industrial Japan had few other opportunities to see more than their immediate surroundings. Teachers stressed the importance of familiarizing children with unfamiliar scenes, for they arouse natural curiosity and create a sense of familiarity which enlarges the vocabulary and provides notions of the world around which are of great value to the child in preparation for more systematic learning at a later age.

THE home situation is the primary target of the BBC in Great Britain. *Watch With Mother* may well be the oldest television programme still regularly broadcast over the same national network. Five of its six series of 26 films were produced between 1952 and 1955, and have been repeated regularly ever since. Few British children today have not grown up with *Andy Pandy*, the puppet small child dressed in "clown" clothes who plays with toys, sings and dances like a three-year old with his companion teddy bear. Other familiar figures of early childhood fantasies on television are the *Flowerpot men* and the glove puppets, *Rag, Tag and Bobtail.* While most of these programmes appeal to the young child's love for stories and an imaginary world, a film series made in Canada using real animals to act stories of a colony of small animals (hamster, rat, frog, etc.) called *The Tales of the Riverbank*, is also very popular.

A more distinctly educational purpose is served by *Play School*, a daily

CONTINUED ON NEXT PAGE

'Much that portends of a halo'

25-minute programme aimed primarily at the child at home but ready for nursery school. The eavesdropping audience goes down to two-year olds and includes over a million regular adult viewers. Children with parents, family groups and nursery schools watch—but the target remains the intelligent four-year old sitting alone in front of the set.

The purpose is to stimulate the child with ideas and information which affect him not only during the programme but long afterwards. There is, in fact, impressive evidence of long-term follow-up activities—art work (the BBC receives a steady supply of paintings for the *Play School* picture board), singing, imaginative games and practical play.

A report from the producer observes that "*Play School* tries to offer a child at this crucial stage of its development a wider range of subject matter and a richer canvas of people than has been customary in past children's television programmes for this age range. It takes into account the limitations—restricted terms of reference; small vocabulary; shorter span of concentration—but it makes no concession apart from this. Talking down is a sin. False attitudes are stamped on. The child under five is gullible and all too easily influenced for good or bad. Our responsibility, therefore, lies in not taking advantage of this but assuming a taste and discrimination in the under-five which, like a rather frail flower, can respond to the hands of the right gardener."

THE gullibility of young children is of primary concern to the producers of programmes. An American student of communications has suggested that "a child's early exposure to television, regardless of the content, contains much that portends of a halo. It is all good. It amuses, entertains, and watches over the child. The child, left to his own devices, makes indiscriminate use of the medium. When he is good, he is rewarded with more exposure; when bad, he is often punished by denied use. From these kinds of contacts, standards, tastes and discriminations find no formative roots." Hence the particular responsibility of those who seek no more than to attract and amuse the child audience in order to reach a wide audience for commercial publicity.

But there are pitfalls on both sides, as has been found in countries, such as Australia, where commercial and non-commercial programmes compete for the audience. A primarily purposeful, didactic approach may fail to involve the child sufficiently to make an impact on a large portion of the audience. A primarily entertainment approach may fail to leave a constructive impact. How to balance both approaches is an issue which faces the television director, and not only in the sphere of programming for pre-school children.

This competitive situation is of particular significance to the United States. Among the commercially most successful programmes is *Romper Room* whose format is also distributed to many other countries. The programme emphasizes the involvement of children, not only on the receiving end but in the studio itself.

SOME educators feel that to show little children acting out their games in front of the camera is not desirable, that it impairs the educational impact and leads children to show off rather than to express themselves quietly and creatively as individuals. Others welcome this approach as an inducement to the watching children to participate in the action.

Romper Room suggests many activities which help keep the youngster physically fit, and develop his mind and social adjustment. To familiarize the child with natural and social scenes, and thus to enlarge his horizon and vocabulary, the programme uses films, pictures and objects to show foreign lands, interesting professions, as well as animal life. To develop "reading-readiness" among children, they are taught to recognize and draw letters and numbers, play a game called "Look 'N' See", as well as a word game called "Words and Sounds" to increase their vocabulary.

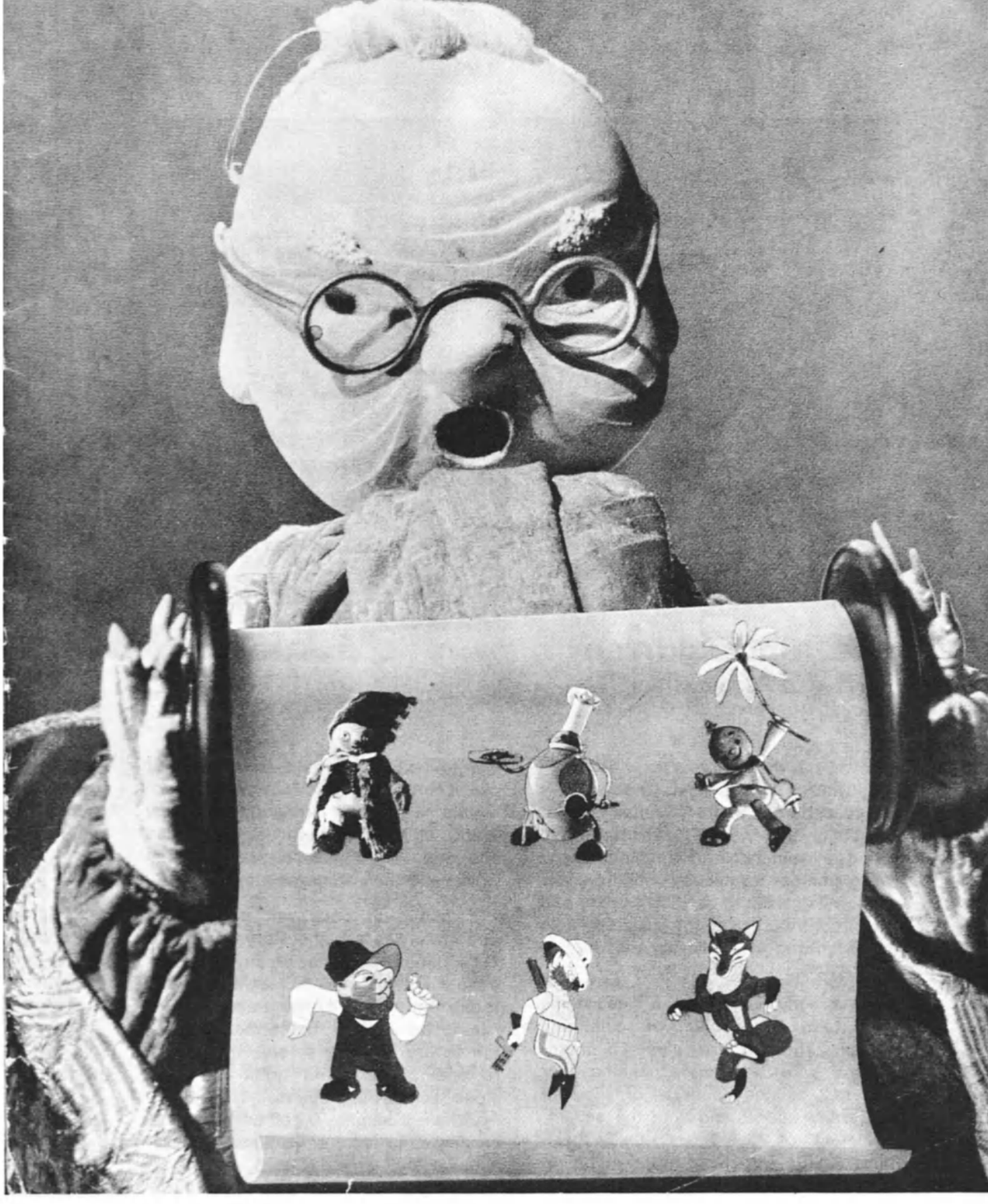
Here is a slick production designed to attract, amuse and instruct young viewers and, incidentally, also to sell merchandise. On the other side of American television are the non-commercial educational television stations which make special efforts to provide programmes which are of value to the children and their parents alike.

Notable among the many programmes produced by these stations is *TV Kindergarten* produced at Albuquerque, New Mexico. In this state the need for some new form of pre-school education is so evident that many of the usual reservations about the use of television seem to fall by the wayside. The people of this state have a trilingual culture; the basic language of children who enter school is English, Spanish or one of the American Indian languages, and this diversity in linguistic and social backgrounds poses a particular problem for the school system. Another problem arises because the state covers a large but sparsely populated area. There are no public kindergartens in New Mexico and much of the population could not take advantage of them even if they were offered.

To meet these educational problems of cultural diversity and dispersal of population is one of the primary purposes of the TV classroom which reaches many remote areas and makes proper conditioning for school possible. The programme seeks to prepare the pre-school youngster for his first school year. Using the standard kindergarten curriculum as a backbone, the programme is prepared with the advice of the educational authorities and stimulates the child in reading development, linguistic ability, number ability and social readiness.

"Recognizing the limitations of only 30 minutes per day with the children," adds the report from New Mexico, "emphasis is placed on assisting parents to meaningfully guide the child after the programme is completed. Each project is designed to use inexpensive, readily available materials. Thus, parent education is an important adjunct to the series."

ABSENCE of public kindergartens, especially in the lower income parts of American cities, is a problem all over the United States and particularly in the large, urban areas of the eastern states. Here, educational television finds one of its most important tasks. Station WQED in Pittsburgh produces three times a week a semi-instructional series of programmes for the pre-school child entitled *QED Kindergarten.* The programme was started in 1963 and is regularly used by fifteen other eastern U.S. stations as well as in Chicago and San Francisco. Here, too the station co-operates closely with kindergarten teachers and child development authorities in the elaboration of the programme and the selection of the teacher who presents it in



Television can introduce the young child to knowledge of all kinds, from drawing and music to the mysteries of Nature and the marvels of science. It is often through television that children in great industrial cities first learn to appreciate the beauties of the countryside. In certain regions, such as New Mexico, television programmes prepared with the help of teachers help to overcome the special problem of a trilingual population. In Czechoslovakia, traditional puppet shows help to stimulate artistic and mental activity. Right, a Czech puppet introduces some cartoon personalities.

Photo © Loutkovy film, Prague

front of the camera. Regular feed-back of reactions from children, parents and school authorities helps to steer the programme towards its main objective, to inform and shape the mind of the young child, and to draw on entertainment and amusement to the extent that it serves to enhance this purpose.

All aboard with Mr. Be, another programme produced by educational television in Memphis, Tennessee, is designed to prepare the pre-school child for the first grade and aid in the maximum development of his potential. This programme is presented in a nostalgic 19th century setting built around the romance and exciting mobility of trains, with Mr. Be holding forth as the former engineer of the olden days who now lives in a combination train depot and general store. The store is filled with interesting junk, pictures and pets, and the train is a replica of a famous Civil War train "The General."

One hundred and eighty-three programmes have been recorded on videotape, many of which introduce the children to new sights and facts. One day Mr. Be demonstrates with a home-made steam engine how steam is able to move a train, and tells the story of railroads up to a modern diesel passenger train. On another day, he explains how clocks tell "when" and "how long", and how in earlier times people used to tell time by the sun and the moon. Visits to a shoemaker or a grocery store, to lions who live in the jungle or to the bird house in the zoo, bring knowledge and new words to the young ones. How electricity is a friend of man when controlled, but a dangerous enemy children must beware of and follow important safety rules, is another of the many topics of this instructive programme.

One of the arguments against television for children is that it will keep them from reading, from seeking their own information at their own pace and choice. But experience has shown that television, whether for adults or children, can be as much a stimulator of reading as a distracting, deadening force. It is a matter of how TV is used and how it relates to books. In France, television has for many years carried a weekly programme for adults and a companion programme for children in which new books and authors are introduced to the large television public.

The impact of these programmes is

CONTINUED ON NEXT PAGE

Photo © BBC, London

TELEVISION *(Continued)*

Fan mail from the kindergarten

shown by the eagerness with which publishers try to get their books discussed on them. Similarly, television in the United States has also been a stimulator of reading; many programmes for young children are direct TV adaptations of books and thus contribute directly to their sale or borrowing in public libraries.

Picture Book Parade is a series of films directly based on the illustrations and text of well-known children's books. Through slow close-up photography, with the camera panning over pictures, picking up detail or showing the entire scene, and with the accompaniment of music and text, these films are a simplified, slow type of animation whose pace is suited to the rhythm of child viewers. Local stations use these films, or produce their own visual book reports, as part of regular programmes for school and pre-school children. These programmes, entertaining in themselves, induce children to get hold of the books so they can look at them, or read them if they have already learned to do so.

RE-READING or re-viewing of the familiar is particularly satisfying to children, just as they love to hear the same story over and over again. Many television producers labour under the fallacious assumption that only novelty counts and consider it contrary to the style of the medium to repeat themselves. But that is not the way children see it. "My five-year-old has been asking me to write for weeks to ask you if we could see 'Red Carpet' again," writes a mother from Ithaca, New York, "We enjoyed the other stories too and would like to see them all again and then some new ones."

If television does not provide an opportunity to see the story again, the book does. And so many mothers echo a letter from a housewife in California who wrote: "After we watch and listen, we borrow these books from the library and get a real thrill out of re-reading them and getting a long close look at the pictures." No wonder such programmes, whether produced on film or in local educational stations all over the United States, are particularly popular with children's librarians who welcome the introduction of good books to both children and parents.

Educational television in the United States is the work of devoted people who do not have at their disposal anything like the technical resources and finance available to commercial stations. At Milwaukee, for instance, a group of performers who work for the museum, the public school system, the Bureau of Community Relations, or who are housewives looking after their families, come together as volunteers at the educational station to participate in *Children's Fair*, a variety show geared for viewers aged three to seven. "Tired of violence in the name of humour? Then try your children on a TV diet of Children's Fair," runs the appeal for this programme whose promoters donate their time for this daily half-hour broadcast "to accent the positive aspects of life and the world in which we live."

Reaction against the violence of much of television, whether in programmes specifically designed for them or, more frequently, in general programmes which are seen eagerly by children, is one of the prime motives in the production of programmes by educational stations.

AN outline of the purposes of *The Land of Play*, a programme produced at Michigan State University, sums up this point of view: "There is no need and there is no place for violence in this programme. There are no weapons, no physical attacks, no verbal barrages. The stories may be suspenseful, but not frightening. We use no fear appeals. This is a happy, light, positive programme. The characters who are involved in the programme are involved in positive ways. Proper conduct is rewarded and rewarding . . . not materially, but other ways. Stories and situations have morals, but morals are never drawn from them and presented to the child wrapped in the label 'MORAL'."

Concern for the moral development of children is also a preoccupation at the Kiev TV Centre in the Ukraine, which presents special programmes for pre-chool children every day in the morning and the early evening. These programmes seek to develop the curiosity of children, to give them

Opinon surveys among teachers confirm that young children are far more attentive when schools make use of television. Kindergarten teachers in Venezuela, for example, report that collaboration and comprehension are improved. Left, two well-known puppets on B.B.C. television programmes for the very young: Bill and Ben *the Flowerpot men.*

Can a chipmunk teach the new mathematics on TV? Here, at any rate, he is helping the television teacher to show children how to make a "telephone" with tin cans and string. Children benefit most when learning is presented as a fascinating game.

Photo © Holmes - Lebel - Larry Fried/Curtiss - Camera Press

more intimate knowledge of their surroundings, to promote feelings of social adjustment, and "to help them to understand those actions which are good and those which should be blamed."

Here, too, it is emphasized that "such knowledge should come to small children by a fascinating game and not by direct admonition. While playing and dreaming, children learn at the same time various useful things. The programmes for pre-school children do not include direct teaching of certain subjects but they do include enrichment materials for the educational programmes of kindergartens." *The Pencil Drawer,* for instance, is a game which has been broadcast for several years and in which an artist puppet called "Merry Pencil" teaches children the art of drawing and explains, at the same time, phenomena such as why the squirrel dries mushrooms on the pine tree and why birds fly off to warmer countries. "This programme is a great success among the little ones and the department receives hundreds of letters with pictures drawn by the children at home or in the kindergartens under the guidance of their teachers, nurses or parents."

Finally, we come to Czechoslovakia, the country which has perhaps the greatest tradition in puppetry, in children's films and now in television programmes for the little ones, broadcast regularly ever since 1958. A report from the editor of kindergarten programmes in Prague reads like a summary of all that has been said by producers around the world; for children are children and have much the same reactions, independent of the culture in which they live, while the television medium poses similar problems and opportunities irrespective of its particular form of organization and control.

The danger of passivity in the viewer is recognized here as elsewhere. The child viewer "is inclined to consume passively miles of stories, events and tales, without being forced to strain his mind," a danger which the producers in Czechoslovakia strive to combat by seeking "to incite, instigate, inspire and excite our children; we want to acquaint them with the unknown world that surrounds them. We want our viewers to be entertained, but simultaneously to be instructed."

WHILE initially Czech TV programmes were aimed at the entertainment of very young children, a much closer co-ordination with preparation for school in kindergartens is now sought by the producers who base their programmes on the official kindergarten curriculum. The fairy-tale form is considered most effective in order to influence and educate young viewers. They take children to the farthest corners of the world and are blended with realistic reportages about the world of grown-ups.

Programmes are popular with kindergartens, a selected number of which regularly report back audience reaction to the station so that programmes may be adapted to their needs. Producers seem confident that the programmes are in fact stimulating artistic and mental activities, and contributing to the development of individual capacity in the child. Programmes are broadcast twice a week (with one repeat) and on Saturday morning the announcer acquaints teachers with the content of subsequent programmes to aid them in their use. For the producers recognize the importance of the teacher "who must not waste the feelings which the children have experienced during the programme."

Television serves the child and the parents, the school, the teacher and society as a whole when it develops the personality and broadens the horizon of youngsters about to enter school. This educational task responds to the yearning of children for knowledge, to their love of fantasy and their curiosity of life. "If it is said of adult listeners that you will never satisfy everyone," states the producer of Czechoslovak kindergarten programmes, "then our smallest listeners surely form an exception which proves the rule. Five and six-year-old viewers do not telephone, do not threaten, do not make categoric demands. But naturally they also have wishes and desires, usually that one of the fairy tales be repeated. Through adults they often show us their dissatisfaction when they are cheated out of a programme. But they have always been, they are and will probably remain the most grateful of television viewers."

the director of the National Book Centre of Pakistan examines

READING HABITS AND BOOK PUBLISHING IN ASIA

by Ibne Insha

Photo © Holmes Lebel - Camera Press

THE great expanse called Asia extends from Iran on the periphery of the Middle East, to palmgrove islands of the Pacific, many thousands of miles eastwards. It covers a multitude of peoples, cultures, languages, and scripts; the vast region comprises radical variations in terrain, climate, customs, traditions, modes of living and thinking, as well as social and environmental situations generally. The patterns of statehood and economy differ, too, and the interstate cultural affinities are mostly limited to immediate neighbourhoods. Yet it is Asia all the same, with unmistakable features of identity and similarity.

All these countries are what we call developing countries. All share a considerable, in some cases disturbingly high rate of illiteracy, and all are trying to improve the situation by employing breakthrough literacy programmes. Most have neither a very high living standard or per capita rate of income, and the inadequacy of means of communication is a general handicap. All need a quickened pace of progress in technological fields; and the advancement and modernity of Japan, for instance, is still a rare phenomenon in this region.

Most are tradition-bound and have often disregarded the utilitarian aspects of education. Even the learning of the three Rs has amounted to the achievement of knowledge for its own sake, or, at best, has been regarded as a key to professions like teaching, the priesthood or the judiciary. Now, however, the emphasis is changing in favour of the sciences. Many of the countries in this region have been under foreign domination or influence for extended periods and are only now changing over, or going back, to national languages as media of education. This has a considerable bearing on reading preferences of the better educated classes.

What deters a potential reader? We may enumerate the deterrents to the use and enjoyment of books as: illiteracy; low purchasing power; non-availability of specific reading matter; lack of information about availability of books; inadequate library systems; inadequate book promotion.

How to induce people to read. Of the deterrents named, abolition of illiteracy is of fundamental importance, yet we are not concerned with it directly here. Our immediate concern is to induce those who are literate to read, and to encourage them to go beyond their textbooks. Our typical client is a man with a reasonable measure of schooling (about four years) and a modest purchasing power. The problem is to make reading a "felt need" for him.

He must come to realize that as a student, he stands to gain by extending his area of study not only for examinations but later in life. If he works in a factory or an office, reading can help to improve his efficiency and prospects. A businessman can profit from books imparting information concerning his affairs. A farmer is likely to be interested in better agricultural methods, and a mechanic in the techniques of his trade. A housewife needs books on cookery, knitting or child-care. But of course, all of them need books for general reading—poetry, fiction, travel, history, biography and general subjects. But basically it is the potential reader, man, woman or child, who should feel the urge to read, and that urge has sometimes to be created.

To be a reader requires a reasonable period of schooling—normally four years. It is at this stage that the school teacher or the school librarian should begin stimulating the student to read outside the classroom.

The Unesco Seminar on Children's Literature, in Teheran, in April 1964, drew up a Book Utilization Course covering about 36 hours over the whole college year. If the use of the school library is encouraged by teacher and teaching is not just confined to prescribed texts, it will go a long way to inculcate the book reading habit. Once acquired it is most likely to

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In recent years Asian countries have made a tremendous effort to increase their book production and distribution. But to do so they have had to overcome formidable obstacles: high density of population, shortage of technical resources and capital. In May 1966, Unesco convened an important meeting to study the possibilities of developing Asia's book publishing industry. Photo shows young readers in a Singapore street.

endure for a lifetime. Perhaps some sort of test based on non-textbooks read by a student might be introduced at the end of his course. School libraries need to be better equipped, too, for a broad, basic and enlightening education.

A network of public libraries. A student's awakened interest in reading will, in time, lead him to the public library and the bookshop. In Asia, we need a network of local libraries in cities and towns as well as in rural areas. Such a network would provide a much needed fillip to the publishing and the bookselling trade. In the United States and the United Kingdom, from 75% to 90% of children's books are bought by libraries; the rest are sold by bookshops to the individual buyer. A similar, even a much smaller ratio of consumption would result in a vigorous publishing industry in Asia.

Street lending libraries. The role of street lending libraries and mobile libraries is significant, too. In India and Pakistan, street libraries known popularly as "Anna Libraries" have existed and flourished for long. At one time one could take out a book daily for an anna (1/16th of a rupee, a pre-metric system coin) and a voracious reader was welcome to more than one book for the same fee. A survey has shown that housewives and students predominate as the clientele of these institutions.

The choice of books in these libraries is not always a happy one. In fact, there have been complaints that they stock cheap fiction only, and sometimes undesirable literature too, hence that

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'Penny book clubs' for children

the authorities should suppress them. It may be so. But some way should be found to improve rather than close them.

Experiments are being conducted with mobile libraries and "box libraries" in some countries. The mobile libraries, which constitute the well of knowledge that goes to the thirsty have been very useful but their number is limited and needs to be increased. Box librairies contain standard sets of books catering to different tastes. These are supplied by community development organizations to community centres in rural areas and circulate from village to village. It is a good way to make literates life-long readers.

The "home library" is one of the most effective ways to develop book-buying habits in Asia; it incorporates the features of book clubs as we know them to work in the West. A home library can be run by a single publisher who has a strong and varied list, or by a wholesale bookseller.

What is a home library? An instalment plan relying on a strong body of patrons or subscribers. Books are dispensed on attractive terms, and the initial offer is often too alluring to be resisted. As can be seen in advertisements of book clubs, the bestsellers of the season are offered at extremely low prices to new members if they undertake to buy a specified number of books in a year, from a large selection offered, and at a specially low price.

A model plan for a home library for Asian countries has been devised by the consultant to the All India Home Library Plan Society, Artur Isenberg.

Subscribers are asked to pay 5 rupees (about one dollar) monthly, for 18 months, or a total of 90 rupees. In return subscribers who complete the subscription period receive 100 rupees worth of books which they can select from a list of over 500 titles. In addition, each subscriber receives free of charge a number of bonus books as well as a monthly magazine, plus free packing and mailing of books.

A modest discount (of about 10%) on book orders placed after subscriptions have been taken out may be given; or other facilities such as limited credit made available.

The subscriber who does not complete his subscription period does not receive the considerable extra benefits mentioned above, but he does receive his money's worth of books of his own choice. His accounts are credited with any payments he may have made and debited with the cost, at list price, of any books, including bonus books, supplied to him, as well as with the cost of posting them and also the magazine issues sent to him up to the premature closing of his subscription account. In other words, the incomplete subscription is treated like any other retail book purchase.

Different organizations initiating home library plans in India are reported to have sold more than 10 lakhs of rupees ($210,000) worth of books since the first such scheme was launched in January 1960. Since the bulk of the clientele is that section not normally reached by bookshops or other conventional outlets, it really means that a new sector of the literate public is acquiring the book reading habit.

The economics of a home library system are: *small* profits per subscriber, multiplied by a *large* number of subscribers into an attractive *overall* profit.

A simple variation, especially for children, would be something like the "Paisa Library" of Lahore which flourished in the early 1940s; we might call it a "Farthing Library" or a "Penny Library."

The "Paisa Library" scheme was designed to promote saving as well as the book reading habit. Children's books are usually purchased by parrents, but this scheme gave the children a sense of importance since the books were bought out of their own meagre pocket money. The child had to save one paisa a day, which made 30 paisas a month (less than half a rupee, or ten U.S. cents). The sum was sent to the promoters, a leading firm of publishers, who issued a children's magazine of long standing, and all correspondence, dispatch and other costs were paid out of these ten cents. The child received a new book each month for about seven cents net.

The important underlying idea was to encourage the buying of books out of one's own resources as opposed to receiving books as a present. The project was abandoned after more than fifty titles had been published, ranging from 72 to 112 pages. The war raised the cost of materials and everything else involved in production, and it became impossible to continue the "a paisa a day" project. The hallmark of the scheme had been inexpensiveness which still is the prime consideration in most countries, and the system is well worth trying again.

The importance of book festivals and book exhibitions in developing the reading habit in Asia cannot be overemphasized. It is one of the striking ways of bringing books to the attention of potential readers and informing people that the books they are interested in have actually been published.

Admittedly there is a shortage in Asian countries of books in certain fields, particularly science and technology, or biography and literary criticism, but the books that are available are not always known to the general public.

I wish I could quote from the register of comments we keep for every book exhibition. The response is so great that there are always requests by individuals and especially educational institutions for these book exhibitions to be prolonged. It is really exhilarating to see students eagerly queuing to browse among the stalls, and reading books on the spot. Such book exhibitions should be of a general as well as a specialized nature, to attract particular strata of readers.

Our experience shows that book exhibitions should be accompanied by sales arrangements. People who see good books exhibited are disappointed not to find them readily available for purchase and by the time they return home other considerations dampen their enthusiasm and customers for books are thereby lost.

In order to increase the book reading habit, book exhibitions need to be better advertised or publicized, either in the book supplement section of daily newspapers, or through posters, streamers and radio/TV programmes where possible. It is always good policy in Asia to declare a sale at discount for the duration of an exhibition in order to attract potential book buyers. During the Pakistan National Book Festival of 1964, for example, all books were available at 10 % discount, not only at the door of the exhibition, where sale arrangements were provided, but in city bookshops as well. Every bookseller could afford to give a 10 % discount without asking for special arrangements from publishers.

In this connexion I should mention that it is not generally known, even in Pakistan, that money used to buy books can be deducted from income tax in Pakistan. The National Book Centre of Pakistan recently produced a poster to publicize this little known fact and this has had a marked effect on the sale of books.

"Book Festival" is a much more attractive name for general annual events than "Book Exhibition," and it should be given a festive look. In Pakistan, we gave away free of charge thousands of balloons with slogans, book marks and illustrated book lists during the festival.

Movable feasts of books should be provided through bookmobiles, visiting educational institutions, industrial housing areas and other suburbs with displays of books, and carrying extra portable wire book racks and additional stock for display outside the van.

More and better book vending. Book buying is incentive buying. Books would surely sell in greater numbers if a potential reader had the chance to look at them. This takes us to the

need for more bookshops or book outlets with "browsing" facilities. In the West, these are offered by the drugstore or department store. In Asia, we should make use of restaurants, general stores, fairs and festivals or other places where people congregate. In Iran and in Andhra Pradesh, India, this has proved a great success. The success of Iranian paperbacks is based on a shift of emphasis from the bookshop to the news-stand and similar outlets. As a result, bookshop sales now represent only one half of total book sales. Millions of new readers are being created among people who hitherto were outside the orbit of conventional booksellers. Bookmobiles or bookshops on wheels run by cooperatives of publishers and booksellers would also help to boost sales.

Though primarily a commercial enterprise, a bookshop also plays an important cultural role. Municipal and other local bodies in Asia should therefore be pursuaded to reserve centrally located stalls and kiosks for book vending and to lease them on special terms. Asia's railway bookstalls would do well to provide a larger variety of books. Enlarged book vending facilities at the terminals and stopping places of other forms of transport would also do much to stimulate book buying.

IT is imperative, of course, for the reader to be told what books are available. A need therefore exists for more subject lists of functional bibliographies to guide readers. Trade papers could do much in this respect if their scope was widened to include reviews and articles on books.

The National Book Centre of Pakistan has itself published a book list of currently available children's literature. Arranged by subject and carrying an authors' index, the list gives details of the volume, illustrations, content and price of books. Another list published by the Centre covers reference books and book on Pakistan. Such subject bibliographies do much to promote book sales. They should, however, be based on completely objective selections of books so as to make them clearly distinguishable from publishing trade catalogues. They should be modestly, even nominally priced to allow distribution on the widest scale.

Good books are not usually cheap, and cheap books, in turn, are not always good. The ideal situation of good books at cheap prices is a paradox to a book producer. Paperbound books, while revolutionizing the distribution systems, have tried to reconcile the two situations and can be considered as an answer to the growing needs of Asian readers with modest purchasing power. Mass production is a prerequisite, however, since the profit margin of publisher, bookseller and author on a paperback is far lower than in the case of a hard cover edition. According to one graph, the publisher's

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Photo Unesco - Paul Almasy, Paris

Although book production in many Asian countries is expanding, the number of books bought by the people of the region is still no more than one-thirtieth to one-sixtieth of that in the industrialized nations. Asian countries also need three times as many textbooks. Travelling bookshops, like this one in Ceylon, help to ease the book famine, but many more are needed. A revival of the "penny book clubs" which enabled children to buy a book each month for a very small sum has been proposed.

net profit on a paperback retailing at 2/6 (stg.) is about 2 %. On a hard-cover book it would be about 15 %.

Paperback publishing deserves the utmost support and encouragment. Prerequisites are cheaper raw materials, modern printing and binding facilities and also the services of technicians trained by European paperback publishing firms.

One Asian country, Iran, has developed a very successful paperback series entitled "Kitabhai-Jebi", one of whose important innovations is a uniform sales discount. Whatever the price of a book, the retailer gets five rials (about 7 U.S. cents), and unsold books are collected and replaced by the publisher's representatives. Western publishers should be asked to charge nominal copyright fees in order to encourage similar enterprises.

For the illustrated books needed by children, and sometimes published in colour, arrangements for a central and syndicated production of illustrations are advisable, as was recommended by the Teheran Seminar in 1964. The Franklin Organization, operating in some Asian countries, has tried this successfully. Illustrations for everyday science books by Bertha Morris Parker, published simultaneously in Arabic, Urdu and Persian, were produced centrally in Teheran, and the different language texts were printed in other countries.

The writer has experimented with most of the book promotion measures described here, as Director of the National Book Centre of Pakistan, an organization created on Unesco's initiative, which seeks to encourage book development on progressive lines and to promote reading habits. We should like to see similar book promotion organizations, transcending professional interests, set up on a national basis, and then loosely federated on a regional footing.

Ceylon, Iran and India already have such agencies, and in recent years the Unesco Centre for Reading Materials in South Asia, from its headquarters in Karachi, has actively promoted an exchange of information designed to encourage book production and development.

The Unesco Centre issues a magazine, sponsors surveys of reading habits, arranges professional training "workshops" and helps to create a dialogue between representatives of the book world in South Asia.

This has involved Pakistan, India, Burma and Ceylon, which have been in the Centre's orbit for about ten years, to a greater degree than other countries such as Iran, Nepal, Afghanistan and Thailand. As the Centre's orbit is expanding and as mass communication programmes are likely to be given a new stimulus, a closer integration can be expected in the years to come.

Photo © Henri Cartier-Bresson/Magnum

GLOBAL ASSAULT ON THE WEATHER

by Robert L. Munteanu

A new window on the world's weather was thrown open on April 1, 1960 when Tiros I, the first complete weather satellite was launched. To the meteorologist's and the world's amazement, man was on top of the weather, enjoying a long, intent look at its face below and savouring the boundless exciting possibilities of his new and revolutionary approach to the exploration of the atmosphere.

This new look at the vastness and complexity of the weather machine opened up a whole new horizon for meteorology. The satellite, and its ally, the high-speed electronic computer, as well as new developments in communications and observing techniques should enable the weatherman to expand his science to the point where forecasts for longer periods and even, perhaps, the dream of one day controlling the weather, become realities.

For thousands of years, men have observed their local weather, noting its regularities and lamenting its many irregularities. They have naturally looked to the skies for knowledge, but their limited view of the world's weather restricted and confined their knowledge and power to predict.

For almost 100 years, meteorologists of the world have together sought to expose the physical laws behind weather and climate. This, of course, has been no easy task. Unlike other scientists, meteorologists cannot easily carry their research into the laboratory, as weather is altogether too large for study on this miniature scale, and certainly far too large for any one

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ROBERT L. MUNTEANU *is external relations officer of the World Meteorological Organization, Geneva.*

country to undertake a sufficiently wide-scale study.

When the study of weather became the science of meteorology, men of every nation realized that their forecasts and research would be inadequate unless they were based on global data and that their understanding of weather processes could only be translated into useful knowledge by international exchange and co-operation. World meteorology has become an active 24 hours a day science, rushing to meet a host of forecast deadlines. It has become one of the finest examples of international co-operation.

Meteorological satellites and other new techniques have increased the need for international co-operation. The U.S.A. and U.S.S.R., for example, co-operate closely in weather satellite activities through plans for the co-ordination of launching programmes and through the establishment, in 1964, of the Washington-Moscow line for direct transmission of satellite cloud photographs and other meteorological information.

In 1961, the General Assembly of the U.N. called on the World Meteorological Organization to develop a plan which would ensure:

- that these new devices are fully used to advance man's knowledge of the basic physical forces affecting weather and the possibility of large-scale weather modification, and
- that this knowledge is used to develop the existing forecasting capabilities of all member states.

This recent chapter in meteorological history—and to date its most important—really began on April 1, 1960, when Tiros I was launched by the U.S.A. Since that day, ten in the Tiros family of satellites have been put into orbit, and one other experimental satellite called Nimbus. Although Tiros and Nimbus were intended primarily for research, the many thousands of photographs they have taken and relayed to earth have also proved of immediate value to forecasters. Timely warnings of hurricane and typhoon formations have been derived from photographs taken by practically all Tiros satellites.

The satellite stores its cloud photographs on magnetic tape and relays them to earth as electronic signals when it comes within range of a ground receiving station. The satellite can transmit as many as 32 photographs in three minutes to a read-out station, where the signals are converted into pictures, and where electronic computers are used to insert latitudinal and longitudinal grids to give the geographical location. This information is then flashed to the world within six hours of orbit time.

One of the latest satellite devices is the Automatic Picture Transmission or APT system. The APT television system automatically transmits cloud pictures every 208 seconds during the daylight hours. Using a relatively simple and inexpensive piece of receiving equipment, any country can receive pictures from an APT equipped satellite as soon as it comes within their range. These on-the-spot photographs give valuable local information to forecasters.

Nor is the satellite inactive at night. Infra-red detectors measure radiation, the relative temperatures of land, sea and cloud surfaces, the geographical distribution of water vapour and the height of cloud tops. They can indicate where on the earth's surface there is a net gain or loss of energy from the sun. This information is invaluable for research into long-range forecasting. The Soviet satellite Cosmos 92 has already given extensive information on terrestrial radiation and temperature variations through the atmosphere.

On February 3, 1966, the Tiros Operation Satellite system was initiated with the launching of Essa I at Cape Kennedy. Essa I, and its descendants, will obtain cloud pictures over the entire sunlit portion of the earth at least once every 24 hours.

A new weather observation window was placed in space in August 1966 with the launching of the Soviet satellite Cosmos 122. This satellite is now transmitting to ground centres television pictures of clouds covering substantial parts of the earth's surface. Cosmos 122, however, is also equipped with instruments for making radiation measurements in the infra-red band and can thus take "pictures" of cloud systems during darkness, thereby enabling meteorologists to compare cloud pictures made in the visible spectrum band with those made in infra-red rays.

Cosmos 122 is also carrying out another important piece of meteorological research—measurement of the

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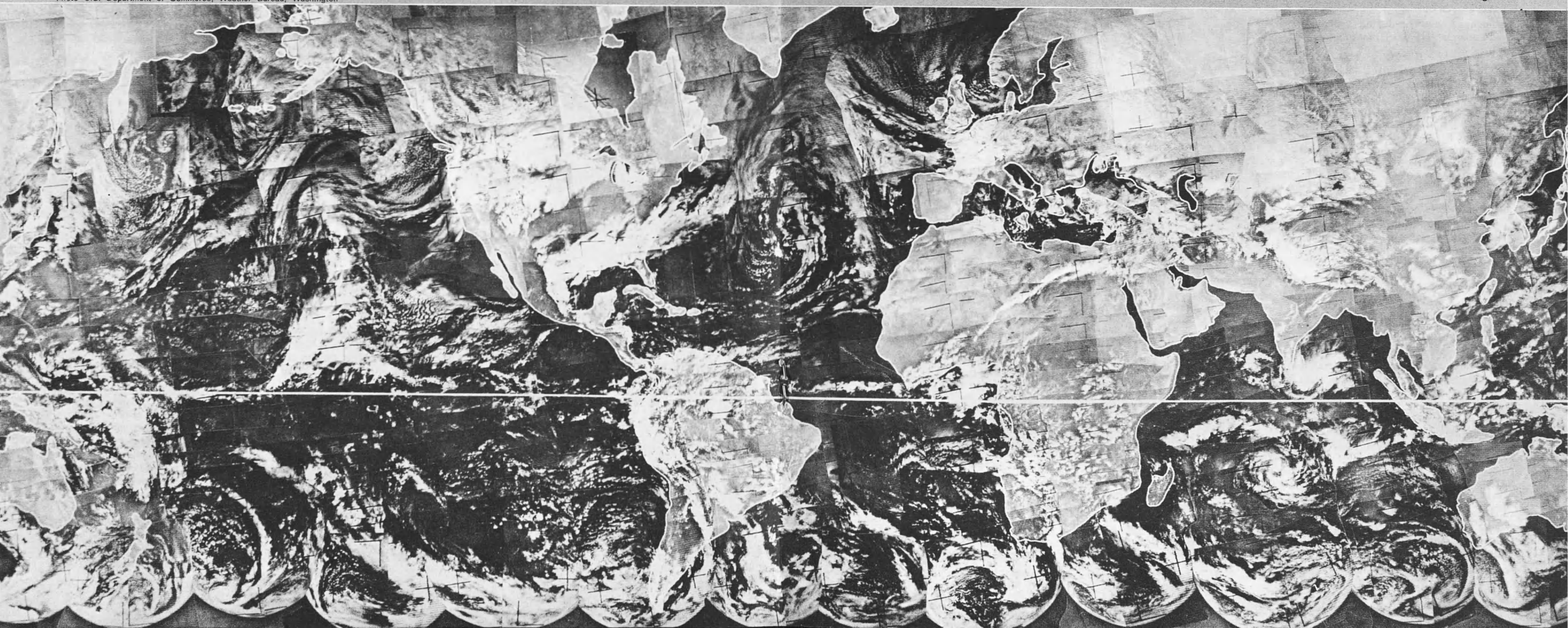
First complete view of the world's weather

Photo U.S. Department of Commerce, Weather Bureau, Washington

This remarkable picture is a mosaic of many photos taken by the weather satellite TIROS IX on February 13, 1965, and is the first complete view showing the world's weather. One can see storm areas and cloud cover over all the continents and oceans; the Sahara Desert is clearly shown completely cloudless. Everyone talks about the weather—and today everyone is doing something about it. Every nation has its national meteorological service and all contribute to and benefit from the world weather system. The expansion of this remarkable example of international co-operation is now being planned by the World Meteorological Organization. The World Weather Watch, as this new global weather system is named, will have three world centres at Melbourne, Moscow and Washington.



No weather data for four-fifths of earth's surface

intensity of outgoing radiation. Solar radiation reaching the earth's surface is the main source of energy and the cause of atmospheric motion. In analyzing atmospheric processes, scientists need to know how much solar energy has reached the earth's surface and in what areas, how much is reflected back to space and how much heat energy is being emitted by the earth's surface and the atmosphere to outer space. Instruments installed in Cosmos 122 are collecting important data on this radiation balance in the earth-atmosphere system. This information is transmitted to offices of the U.S.S.R. Hydrometeorological Service as well as to the meteorological services and research institutes of other countries.

In six short years, meteorological satellites have graduated from the experimental class to the fully operational.

Developments in space technology, automatic data processing and telecommunications will bring great changes to meteorology and to meteorological practices throughout the world. Change and development in this science have become more important than ever before.

Although more has been discovered about weather in the past 50 years than in all previous history, there is a greater urgency behind each country's need for a more perfect understanding of weather processes and for improved meteorological practices.

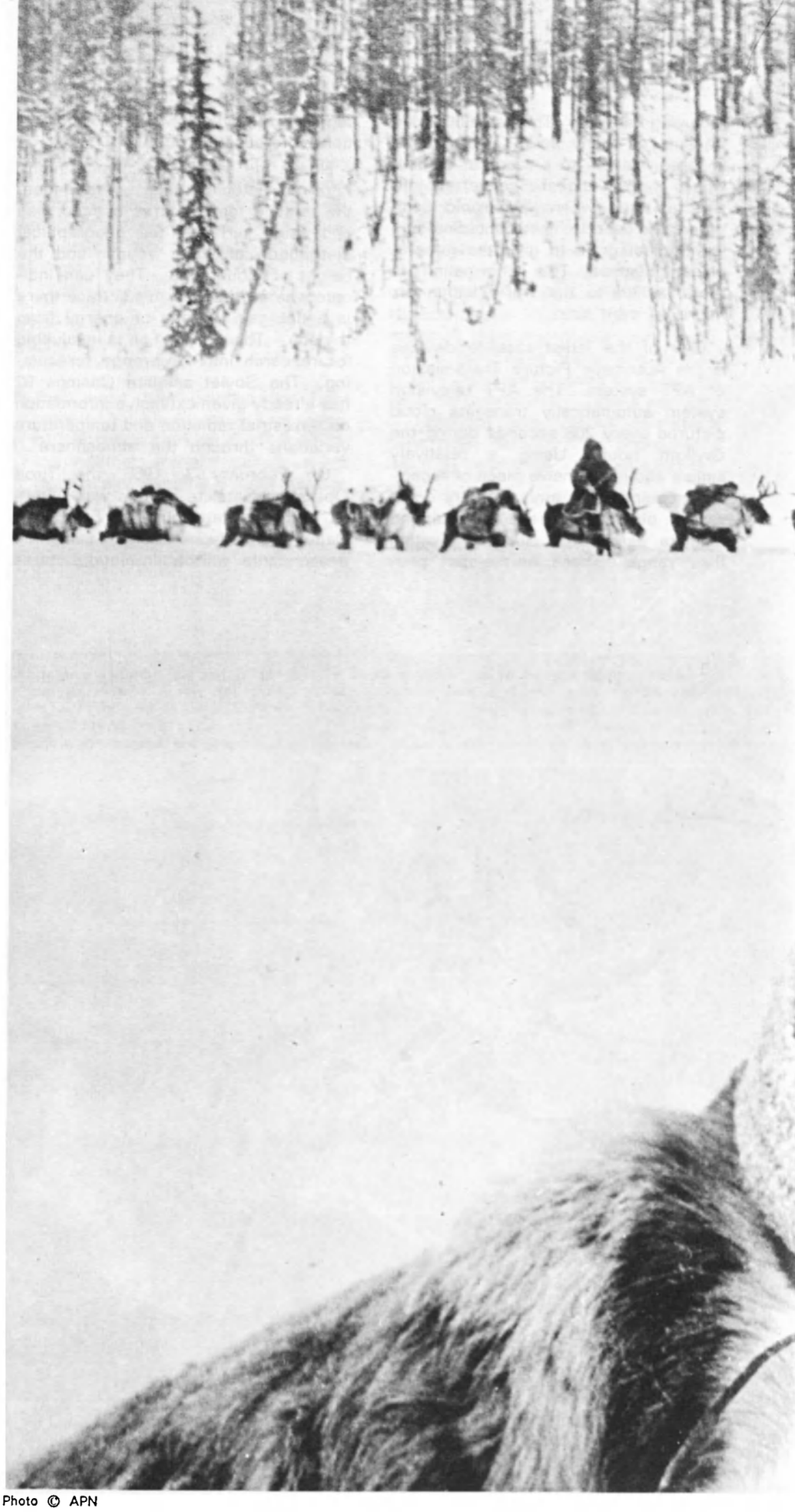


Photo © APN

The weather may be no more malicious, no more devastating, no more kind than 20 or 100 years ago, but the world today is more sensitive to extremes. Our greater population, urbanization, industrialization, and increased dependency on agricultural production, make us more and more vulnerable to the whims of weather. What was once regarded as just a severe storm, or unusually wet, cold or dry conditions now quickly assumes the proportions of a national disaster. Financial losses soar to increasingly staggering heights. And the more complex our civilization becomes, the more damage the weather can cause.

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Could the climate of Europe be modified by diverting the Gulf Stream further to the north? Would blackening the Arctic ice reduce loss of energy by reflection and make neighbouring wastelands more habitable? With the planning and launching of the World Weather Watch—the observation of the earth's atmosphere on a truly global scale—improved possibilities of weather modification may be expected one day, because this observation and research will lead to fuller comprehension of how nature works in creating our weather. Photo shows Soviet far north where temperatures can drop to minus 55 degrees centigrade.

Can science change tomorrow's weather?

The meteorologist urgently requires information and lots of it. For every 24 hours, about 100,000 observations of weather conditions at the earth's surface and about 11,000 observations of the upper atmosphere are recorded and distributed throughout the world under the present international weather system. These observations come from some 8,000 land stations, from 3,000 aircraft and 4,000 ships.

Formidable as these figures are, they only represent adequate information for 20 % of the earth's surface. Large areas of the world have yet to yield vital information. The oceans and deserts have long defied the application of normal observing methods. Satellite photographs are now filling in many gaps on the world weather map, and it is expected that new techniques, such as more sophisticated satellite sensors for the measurement of temperature and moisture distribution and surface winds, and automatic weather stations, meteorological buoys and constant-level balloons will fill many more. The satellite will be a messenger as well as an observer, passing information from these automatic stations and balloons to data collection centres.

The forecaster needs information, but he also needs to receive and process it with all possible speed and accuracy.

Feed a satellite photograph to a computer and in an amazingly short time it has painted a portrait in letters, the shades of black and white in the photograph becoming a variety and a pattern of symbols. This new "photograph" is but one piece of information the computer will use in producing other analyses.

The computer can perform a million calculations a second, assimilate information from thousands of observation points all over the world, sort it, sift it, following faithfully the instructions contained in intricate mathematical equations and print out, finally, the probable pattern of the atmosphere. It is a "forecast" for the forecaster.

Numerical models of the atmosphere, the basic instructions fed to the computer, are a reflection of the meteorologist's knowledge and of the development of new computer techniques. As his knowledge is incomplete, so is the computer's "forecast". When a computer produces a cyclone moving across the Atlantic at 500 m.p.h. (the average cyclone travels at a sedate 15 m.p.h.), the meteorologist knows that somewhere along the line there is a missing quantity in his set of equations. The perfection of these equations is yet another problem for the weatherman to overcome.

The World Meteorological Organization was quick to realize that revolutionary developments in space technology, computing and telecommunications were too broad and far-reaching in their implications to be simply incorporated into the existing international weather system. An entirely new approach was called for. A new concept was needed, which would extract full value from these new developments, unite them with more conventional methods and allow both research and operational work every chance of developing and complementing each other.

The answer is the World Weather Watch (WWW). It may best be described as a kind of international nervous system, highly sensitive and capable of immediate reaction to change in weather throughout the globe. Many thousands of points at the earth's surface and in the upper atmosphere will register any slight change in weather conditions. Satellites will provide the eyes and the overall view. Three world centres at Melbourne, Moscow and Washington and a limited number of regional centres will be the brains and memory of the system, receiving great volumes of data and processing them by computer. An elaborate network of teleprinter and facsimile links will quickly convey pictorial and written information to each component of the system.

Men, money and machines, all the resources of meteorology throughout the world, will be poured into this new system. Highly industrialized nations in the temperate zone, developing countries in tropical and subtropical regions, countries marooned in the vast oceans of the southern hemisphere, all, regardless of their stage of development, will have access to the same global information. For those countries whose weather services are still in their infancy, this will enable them to "leapfrog" over 50 years of scientific and technical development.

For further reading see three publications of the World Meteorological Organization, Geneva: "World Weather Watch" (No 183. TP. 92; price Sw.fr. 1); "Weather and Man" (No 143. TP. 67; price Sw.fr. 2); "Weather and Food" —Freedom from Hunger Campaign Basic Study No 1 (No 112. T.P. 50; Sw.fr. 2). See also "A New Look in Meteorology: the World Weather Watch" by K. Langlo (Unesco's quarterly "Impact of Science on Society", No 2, 1966; annual subscription: $2.50, 13/- (stg), 9 F; per copy: $0.75, 4/- (stg), 3 F.

It is an easy matter to draw up a long list of benefits which will follow in the wake of the WWW. Improved aviation forecasts, cyclone and flood warnings spell Safety. Greater knowledge of rainfall and evaporation mean Power for industry and agricultural Prosperity. And as the Watch grows more alert, more knowledgeable, the list lengthens.

All methods of observation, communication and forecasting, old and new, and all future developments will be absorbed into the system. It is already visualized that satellites will collect reports from automatic weather stations, floating balloons and meteorological buoys and pass this information on to the world centres. Communication links will be further speeded up by using satellites for the exchange of data between world regional and national centres. The computer will take over more and more of the duties at present carried out by the forecaster himself.

"Everyone talks about the weather, but nobody does anything about it." This is an old complaint. But more frequently today there is talk of the long-range forecast and modification of weather and climate.

Many weather services already issue forecasts for periods of up to three days ahead and with substantial success. As knowledge of the general circulation of the atmosphere accumulates, the forecaster will endeavour to extend the period of his prediction.

When the meteorologist can produce mathematical models which are faithful to the atmosphere, the computer will not only forecast accurately, it should also help him to anticipate what would happen to the world's weather if man diverted the Gulf Stream, dammed the Bering Strait, poured oil on the oceans, or blackened the Arctic ice. By coating large areas of ocean with chemicals, for example, he might reduce evaporation and therefore the heavy rainfall and violent storms in tropical regions. By blackening the Arctic ice, he might reduce loss of energy by reflection and make neighbouring wastelands more habitable. But he can only embark on such large-scale modifications when he is perfectly confident that their long-range effects will be entirely beneficial.

The weather will be robbed of its power to catch us unawares, and may instead be harnessed for man's greater comfort and prosperity.

Since 1961, more than 130 typhoons in the Pacific, cyclones in the Indian Ocean and hurricanes in the Atlantic have been detected and tracked by satellite and long-range radar. Advance warnings of such calamities help to minimize losses on land and sea. Photo shows a coastguard cutter aiding a vessel disabled by a hurricane in the Gulf of Mexico.

Photo USIS

Every day over 110,000 observations of weather conditions at the earth's surface and in the upper atmosphere are recorded and distributed throughout the world. These observations come from some 8,000 land stations, from 3,000 aircraft and 4,000 ships. Right, Argentinian weather observer on duty at a post 4,000 metres (13,000 ft.) high in the Andes waves to a passing aircraft. His post is one of three weather stations on the border of Argentina and Chile.

Photo © Paul Almasy, Paris

THE WORLD OF THE COMMUNICATIONS SATELLITE

by Arthur C. Clarke

This is being written in a tiny fishing village on the south coast of Ceylon, only a few hundred miles from the equator. There are no telephones, no electric light, no newspapers, no cinemas; there are a few battery-powered radios, but reception is poor on the short waves and impossible on the broadcast band.

It is difficult for a visitor from one of the more developed countries to imagine the social isolation of such a community—though this village is positively suburban when compared with thousands in the more remote parts of Asia and Africa. Most of the human race exists in a cultural vacuum; it is still divided into myriads of insulated villages or tribes, as it has been since the dawn of history. But now, in a brief moment of time, all this will end. The coming of the communications satellite will make it impossible for any human group—indeed, any individual—to be more than a few milliseconds from any other. The social consequences of this, for good or evil, may be as great as those brought about by the printing press or the internal combustion engine. And they will come upon us much more swiftly.

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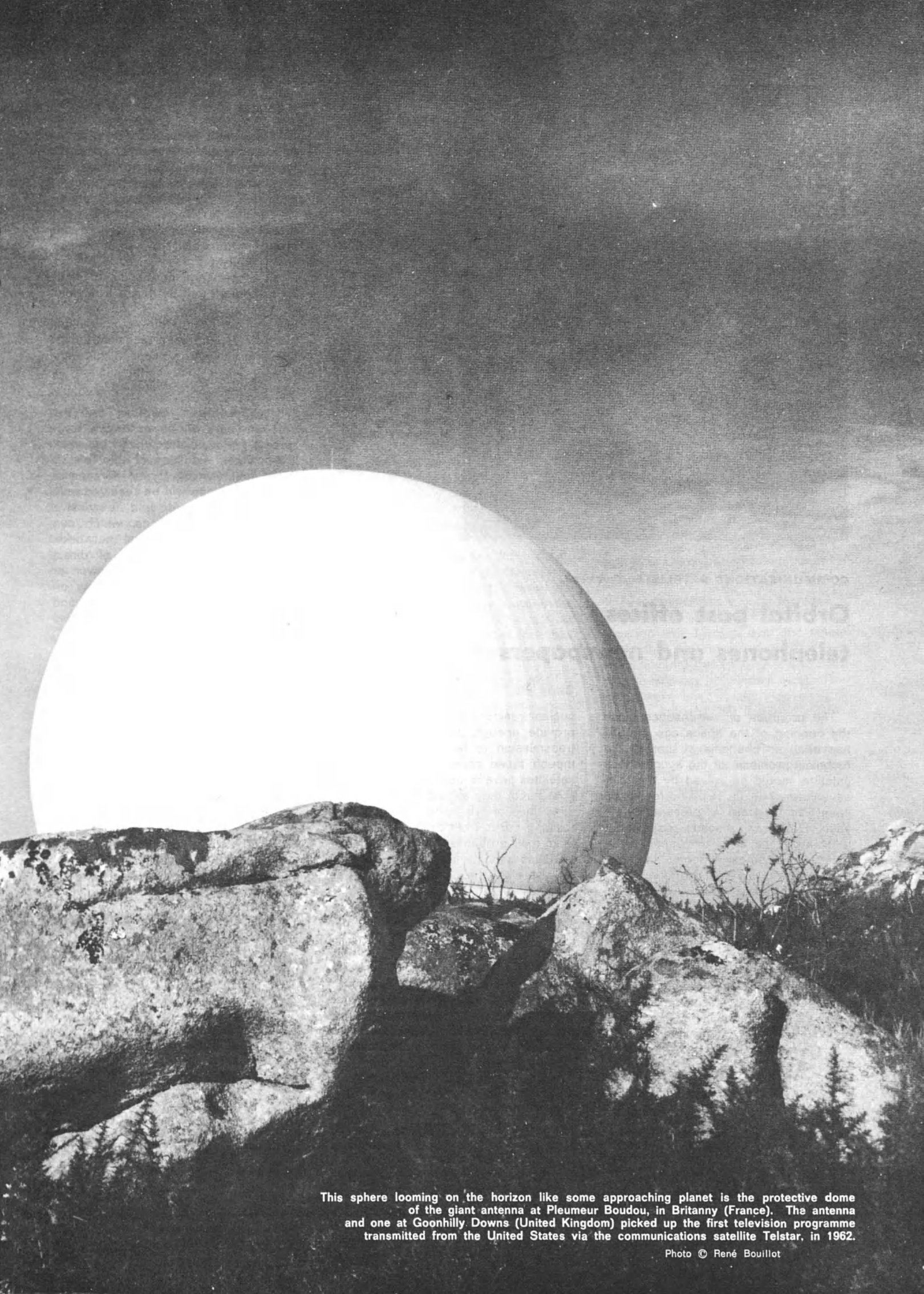
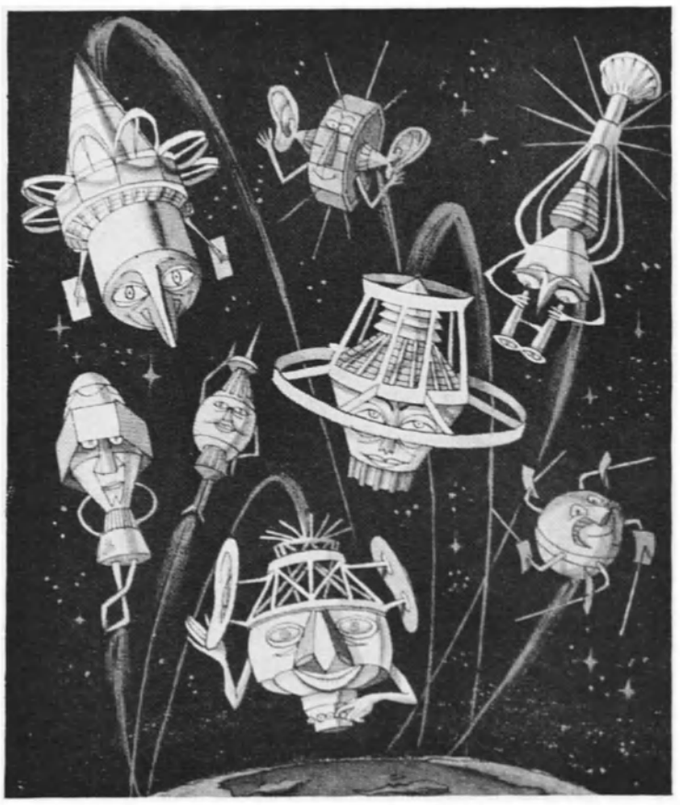
ARTHUR C. CLARKE *is a British science and science fiction writer. He is president of the Ceylon Astronomical Association and was formerly chairman of the British Interplanetary Society. In 1962, he was awarded the international Kalinga Prize for the Popularization of Science. Among the books he has published are "Interplanetary Flight", "The Exploration of Space", "Voices Across the Sea", "The Challenge of the Spaceship", "The Other Side of the Sky", "A Fall of Moondust" and "Voices from the Sky".*



This sphere looming on the horizon like some approaching planet is the protective dome of the giant antenna at Pleumeur Boudou, in Britanny (France). The antenna and one at Goonhilly Downs (United Kingdom) picked up the first television programme transmitted from the United States via the communications satellite Telstar, in 1962.

Photo © René Bouillot



The four space fantasy drawings on these pages are by the U.S. artist J. Huehnergarth. © Vitro Electronics, Silver Spring, Maryland (U.S.A.).

COMMUNICATIONS SATELLITE *(Continued)*

Orbital post offices telephones and newspapers

The progress of astronautics since the opening of the space age in 1957 has been so phenomenal that all the technical problems of the synchronous satellite should be solved by the mid-seventies. Millions need no longer be spent, as they are at present, in the vain quest for absolute component reliability. The communications satellites may not be permanently inhabited, but they will be regularly serviced by low-thrust ferries which can bring repair crews to deal with any emergency within a couple of hours. For by 1975, of course, there will be numerous manned space complexes in orbit, to conduct scientific research and to operate the presently unimaginable zero-gravity, high-vacuum industries of the next generation. The communications satellites of the later part of this century may be part of these systems, and will share their servicing facilities.

With the development of space technology, therefore, all but one of the synchronous satellite's present limitations will pass swiftly into history. Rockets are already under development that can put many tons of payload into the twenty-four hour orbit; nuclear reactors such as Snap-8 could provide enough power for direct TV transmission to home receivers. Although those concerned with today's satellites have to use the tools currently at hand, they should not let present difficulties and failures condition their thinking. But I certainly do not envy them their problems, for every communications satellite built during the next ten years will be obsolete as soon as it is launched.

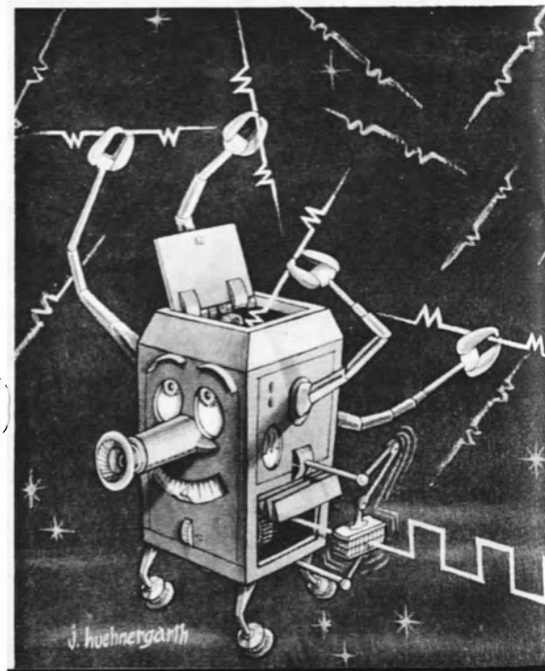
The only fundamental objection to the synchronous satellite is the propagation time lag, which of course does not affect radio or TV services, but only telephony. I am convinced that once the inevitability of this time lag is understood and users are taught the proper speaking procedure, they will have no difficulty in handling it. Every generation comes to grips with new techniques; our fathers had to learn to use the dial telephone, our grandfathers, the telephone itself. We are currently grappling with long-distance dialling and ten-figure numbers; our children may think nothing of ending each stretch of conversation with "over"—and it would probably improve our own telephone procedure, and shorten our talking time, if we did this even now.

In any event, if the delay does prove to be intolerable, then we can establish low-altitude satellites (perhaps in accurately sub-synchronous twelve, eight, six or three-hour orbits) purely for telephony. These might provide a first-class, premium rate service; the cheap rate would be through the twenty-four-hour satellites. (As a much longer term possibility, it might be mentioned that there are a number of theoretical ways of achieving a low-altitude, twenty-four-hour satellite; but they depend upon technical developments unlikely to occur in this century. I leave their contemplation as "an exercise for the student".)

It seems clear, therefore, that the next ten years will be an interim, transitional period, characterized by small low-powered satellites of the Telstar, Relay and Syncom type. Transmissions from these will be received only by very elaborate and expensive ground tracking stations, which can feed signals into national networks. There will be no question of direct broadcasting to the home viewer or listener; he will still have to rely on his existing local stations, if any, and must accept what they choose to give him.

Even so, the communications satellites of the next few years will have a major impact on world affairs, and particularly upon relations between the United States and Europe. Telstar proved this in the first few weeks of operation, when it established the first TV bridge across the Atlantic. As in the case of the first Atlantic cable a hundred years earlier, contact was intermittent; but—again, as in that case—it will soon become permanent.

Because they share many common interests (including language), already



possess extensive rebroadcasting facilities, and are separated by a relatively small time differential, the Americas and Western Europe will obviously be the first to benefit from communications satellites. Some of the services which may reasonably be expected, either experimentally or on a full operational basis, during the next decade are:

The Orbital Post Office. It has been pointed out by S. Metzger that a single 5 mc/s satellite has enough information-handling capacity to carry all first-class and airmail correspondence between the United States and Europe. Delivery time would be reduced to approximately half, the limit being set by the physical collection and distribution of the mail. One of the chief problems involved in this system is psychological; how would the public react to a postal service in which its letters could be read by unauthorized persons at any point? However, it accepted wartime V-mail; and for really confidential correspondence, there would be no difficulty in developing private electronic coding systems, so that only the right recipient could receive readable copies.

As ground facilities improve, to keep up with the possibilities offered by the satellites, we may expect high-speed facsimile systems to spread to at least all important towns. For business (as opposed to personal) needs, the distinction between mail, telegram and teletype will rapidly blur. In each case, transmission time will approach zero, with profound effects upon industry and public affairs, and a speeding up of the tempo of life.

Orbital Newspapers. The simultaneous setting of international editions has already been demonstrated. Influential newspapers such as The Times of London and the New York Times will experience a great increase in distribution and immediacy. One of the first countries to benefit from this will be, rather ironically, the United States, which has never possessed a really national newspaper. In the longer run, however, the newspaper as we have known it for the last three hundred years cannot be expected to survive the advent of communications satellites; ultimately, the home presentation will become purely electronic.

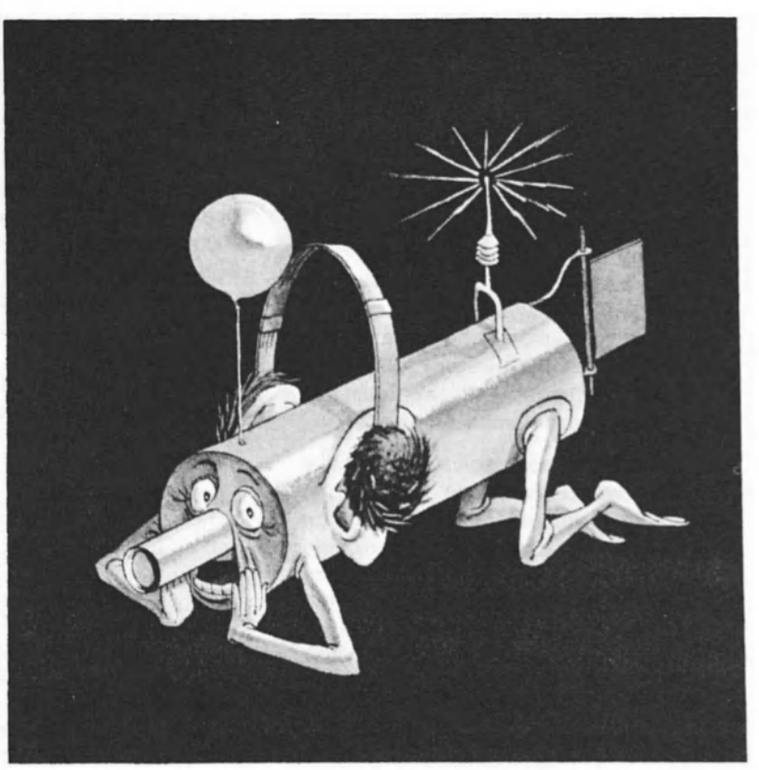
Intercontinental Telephony. As more and more band widths are made available, there will be a tremendous increase in long-distance telephony. It is impossible to set a limit to this; man is a talkative animal, and all estimates that have been made of his need for communication have been swiftly surpassed. Although transatlantic calls may not be substantially cheaper during the next decade, I suspect that well before the end of this same century all telephone calls to anywhere may be charged at the same flat rate. (How much of the present cost of a call goes to maintain the equipment that merely calculates the bill?) Eventually, the telephone may become a free public service; it will have the same status as the water supply, for in the society of the future it will be equally essential. Any tax on free communication is detrimental to the public interest.

The full consequences of swift, cheap, and universal person-to-person telephony (and later television) cannot possibly be anticipated at this stage. One can only hint at some trends which may become apparent during the next decade, and dominant during the one that follows. They are:

■ A great decline in personal correspondence, continuing the trend already started by the telephone—and consequently reducing the need for the "Orbital Post Office" just when it becomes technically possible.

■ A correspondingly great increase in long-distance personal contacts. The situation will develop over the whole world that now exists in great cities, when intimate friends may talk to each other every day but seldom meet. This would have been totally inconceivable only a hundred years ago.

■ A steep decline in transportation for other than pleasure purposes. Effi-



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Blackboard in the sky for multimillion classes

cient communications and efficient transportation are, to some extent, opposing influences. If either were perfect (i.e. free and instantaneous) there would be no need for the other. Thus one can envisage the time, in the not too distant future, when conferences could be conducted with none of the participants leaving their own countries—or even their homes.

It may be objected that much of the important work at such conferences takes place in private and behind-the-scenes negotiations between individuals, not amenable to telecommunications. But even this will cease to be true as person-to-person services multiply. A generation from now, a delegate in Canberra may be able to locate one in Washington much more easily than either could do so today, if they were both looking for each other among the many committee rooms, private suites, simultaneous lecture sessions, dining rooms and bars typical of a large international conference circa 1960.

Now let us look a little further ahead, to the second phase in the development of communications satellites—particularly the impact of direct broadcasting on the undeveloped countries. This, coupled with the timely invention of the transistor, may give a great stimulus to radio; though we usually associate satellites with television, it must not be forgotten that most areas of this planet cannot yet receive reliable, good quality sound.

However, radio brings us immediately to the question of language. A single orbital transmitter can broadcast high-fidelity sound to half the world —but can it provide programmes of equal interest to the Congo Pygmy, the Afghan tribesman, the Greenland Eskimo, the man-about-Manhattan? Obviously not, until they share a common language and, at least to some extent, a common culture.

Communications satellites will make a basic world language mandatory. Just as (in quite recent times) all men had to learn to read so that they could work and even survive in modern society, so in the one world of the very near future they will have to possess a language in common.

The full potentiality of educational programmes from satellites could not be exploited, however, until the arrival of vision; one could hardly teach the written language without this aid (though a great deal could be done with the help of leaflets keyed to the programme and distributed in advance). And here I would like to make a suggestion for an interesting compromise between radio and full-scale TV.

It should be possible to develop a cheap and simple slow-scan facsimile-plus-sound receiver which could operate on the normal radio band width, without requiring the approximately thousand-fold greater spectrum space needed by TV. Such a device could reproduce line drawings and cartoons (halftones would be unnecessary) at a perfectly adequate speed for educational purposes, where the same picture has to stay in view for a minute or more. It would be the remote equivalent of the teacher's blackboard, and with its aid, even language could be taught to peoples who did not share a single world of their instructor's tongue. It would thus be possible to tape programmes suitable for multimillion classes.

The impact of such a device—every element of which lies completely within existing technologies—upon preliterate societies can perhaps be judged by the following example.

In 1948 Monseñor Jose J. Salcedo, appalled by the poverty and illiteracy in his parish, set up a small radio transmitter in the mountain village of Sutatenze (Colombia). His facilities were quite limited but his objectives were large; reduction of illiteracy and provision of useful information. Starting with a few hours of broadcasting on Saturday evenings to fifteen receivers and an audience of some 5,000 listeners, Monseñor Salcedo's programme had grown by 1954 to six hours of daily broadcasting to 16,000 receivers and 200,000 listeners... By 1960 there were in excess of one million student listeners... With a very modest investment, Monseñor Salcedo has radically transformed rural life over a large part of Colombia. Through communal reception, supported by first-level maintenance by parish priests, he has provided a broadcasting system suited to the meagre resources of the people and responsive to their needs.

This gives a foretaste of what may be done by satellite communications to reduce illiteracy and ignorance—if we decide to devote them to this service rather than to selling soap. (Not that I am against soap, but I am against pretending that one soap is better than any other, and feel that it is essentially degrading to the communications industry to be dependent upon such impostures.)

Because the slow-scan receiver would require a bandwidth of less than 10 kc/s, it avoids the power and frequency allocation problems which blur the global TV picture, and could start functioning in the very near future.

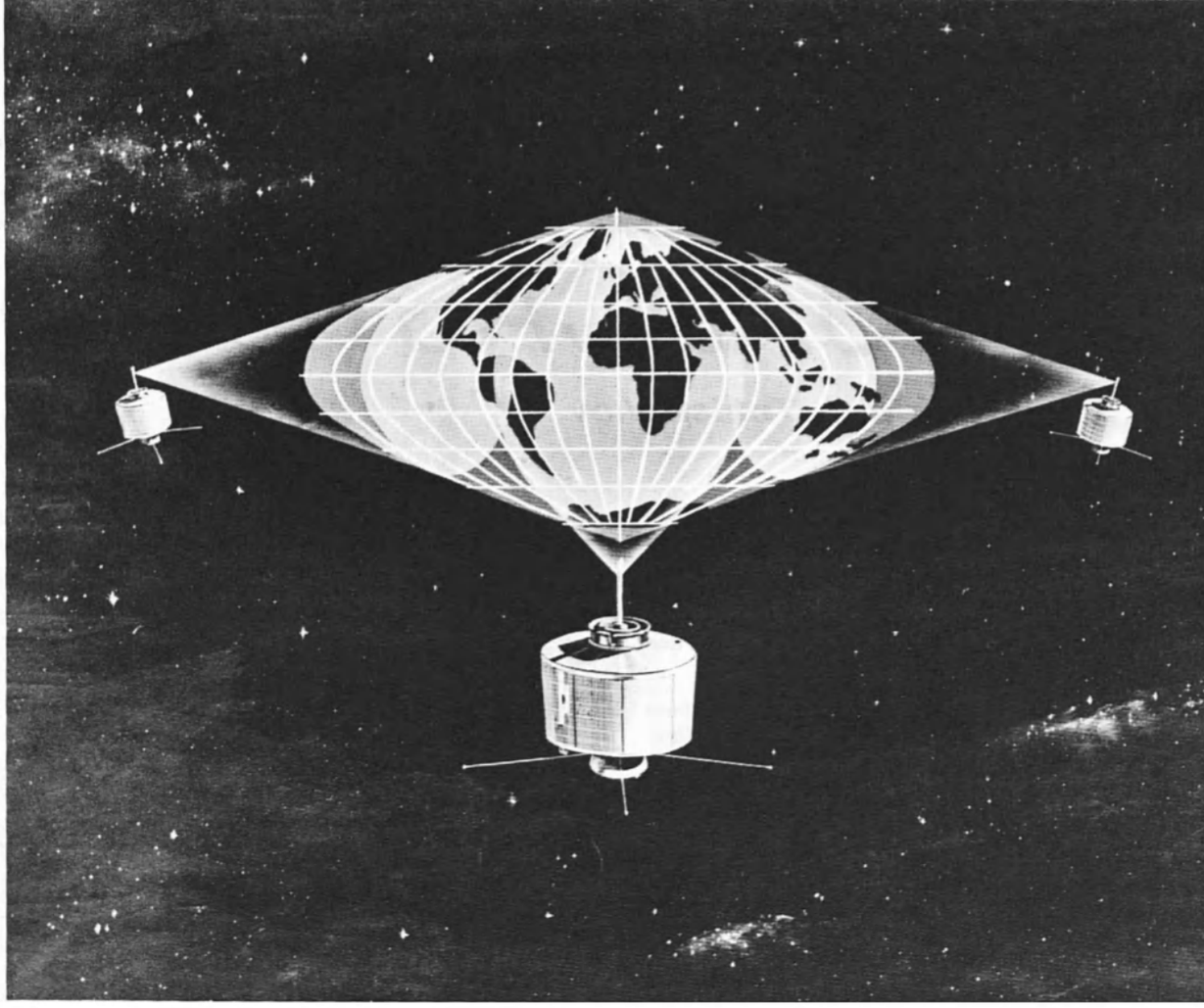
There is no question, however, that global TV will arrive just as soon as it is technically and economically possible. So much has been written on this subject that it is difficult to add anything new to it, but the following comments seem in order.

It is often said that the existence of time zones will inhibit the development of instantaneous, planet-wide communications. This precisely parallels the argument, heard at the beginning of this century, that motor cars would only be of use inside the cities, because, of course, there were no roads elsewhere on which they could operate!

When we have true global communications, our way of life will adapt to them—not vice versa. It would be frustrating to live in a society where, at any given time, between a third and a half of one's acquaintances were asleep. This will be the global situation, a quarter of a century from now, and society will have to make some Procrustean adjustments. Current attacks on the problem of sleep may give one answer; perhaps we can condense our present requirements, by electronic means, into an hour or so a day. Or the long range solution, unattractive though it is, may lie in the wholly artifical world where life goes on independently of the sun, and all the clocks on the planet keep the same time. As will appear later, this solution would not be only unpleasant, but unstable.

The existence of nationally operated, direct-broadcasting TV satellites will immediately focus attention upon two problems which today are merely a minor annoyance, but which tomorrow will be intolerable. They are censorship and jamming. For the advent of communications satellites will mean the end of the present barriers to the free flow of information; no dicta-

WORLD GIRDLING TRIO



Drawing shows how three synchronous satellites placed in orbit around the equator could provide communications coverage over most of the world. Experiments have also en made with other types of communications satellites such as those placed on inclined elliptical orbits (see article next page).

Drawing - USIS

torship can build a wall high enough to stop its citizens listening to the voices from the stars. It would be extremely difficult, if not impossible, to jam satellite broadcasts; any attempt by one country to do so would result in an act of space piracy, or a global telecommunications nuisance which the rest of the world could not permit.

One of the immediate objectives of the ITU, therefore, should be a total ban on jamming, and a recognition by all nations that such behaviour is as uncultured as interrupting other people's conversation by making rude noises. And very much more dangerous, since so many vital lifesaving and navigation facilities now depend upon radio links.

It seems that we have, in the communications satellite, a technical device that may help to enforce good behaviour and co-operation even upon reluctant parties. (The meteorological satellite, with which it is closely linked, will do the same). Its influence will be like that of air transport, though on a much larger scale and affecting whole nations rather than a relatively few favoured individuals. The inexorable force of astronomical facts will destroy the political fantasies which have so long fragmented our planet. For when all major artistic productions, entertainments, political and news events can be viewed simultaneously by the whole world, the parochialism and xenophobia of the past will be unable to survive.

This will be one major influence of communications satellites; another, perhaps even more fundamental, may be the reversal of a historic trend which has proceeded with scarcely a break for five thousand years. The traditional rôle of the city as a meeting place is coming to end; Megapolis may soon go the way of the dinosaurs it now resembles in so many respects. This century may see the beginnings of a slow but irresistible dispersion and decentralization of mankind—a physical dispersion which will take place, paradoxically enough, at the same time as a cultural unification.

It will be none too soon, for it has been truly said that the measure of man's unhappiness is his estrangement from nature. There is ample proof of this in the fact that the most vicious of all savages are now to be found in the rotting stone jungles of our great cities. Civilization, in historic fact as well as in etymology, was the child of the city; but now it has outgrown its parent and must escape from its suffocating embrace.

It will be able to do so when almost all the sense impressions, skills and facilities that we employ in everyday life become amenable to telecommunications—as they will. For as I concluded in my address to the XIIth International Astronautical Congress in Washington, 1961:

What we are building now is the nervous system of mankind... The communications network, of which the satellites will be nodal points, will enable the consciousness of our grandchildren to flicker like lightning back and forth across the face of this planet. They will be able to go anywhere and meet anyone, at any time, without stirring from their homes... all the museums and libraries of the world will be extensions of their living rooms...

And it will not matter where those living rooms may be; for on this planet at least, the conquest of space will be complete.

This article was prepared at the request of Unesco to serve as background for a Unesco report on space communications. It was later presented by Arthur C. Clarke at the Unesco meeting of experts on the use of space communication by the mass media in December 1965.

HURDLES IN SPACE BROADCASTING

by Nicolaï I. Tchistiakov

Just nine years have elapsed since the launching of Sputnik 1. In these few years, with much intensive work, the foundations for the use of satellites for communication, and particularly for radio and television, have been firmly laid.

Broadcasting was part of the earliest probes into space. Conversations with Yuri Gagarin during man's first orbital flight were transmitted through the broadcasting system of the U.S.S.R. in April 1961. In August of the same year the Soviet television audience had its first view of a cosmonaut in space flight. By 1964 television viewers were shown not only the inside of the cabin, but also the view of Earth from space. In 1965 they watched cosmonaut Alexei Leonov take the first walk in space.

With improvements in technology came the satellites Telstar and Relay, launched by the United States in 1962 and 1963, which made possible for the first time short, experimental television transmissions over very long distances.

In 1964, Syncom and Early Bird, in synchronous orbit, realized television transmission for long periods, including the broadcast of the Olympic Games from Japan.

In April 1965, the Soviet satellite Molniya 1 ("lightning") was launched on an elliptical orbit with its apogee in the northern hemisphere at a height of 40,000 km (25,000 miles). The period of orbiting is 12 hours, and Molniya 1 makes one circuit over the U.S.S.R. and a following one over North America. A 40-watt active relaying apparatus on board, with two spares, made possible the first regular television transmissions between the western U.S.S.R. and its far eastern lands for periods of from eight to nine hours.

In October 1965, the launching of Molniya II further increased the possibilities of television transmission throughout the eastern part of the U.S.S.R. On October 17, for instance, Soviet television viewers on the Pacific coast were able to see the Denmark-U.S.S.R. football match being played in Copenhagen.

In November 1965 the first successful experimental transmissions of colour television from the U.S.S.R. to France were carried out via Molniya I.

The successful experiments with communication satellites by the U.S.A. and the U.S.S.R. show that they have an important role to play in the development of broadcasting. Comparisons are now possible between various types of orbits. In the use of satellites, the main emphasis is on the transmission of television programmes.

Without using satellites, the long distance transmission of radio broadcasts has not been difficult or expensive, and improvements in shortwave, radio relay and cables offer continually the possibility of further progress. Sound broadcasts are recorded and transmitted swiftly, and possibly will be sent by supersonic rocket in the near future.

Copying television programmes and transmitting significant news events present greater problems. This calls for broad band channels such as coaxial cables, wave guides, microwave relay lines and communications satellites. We are aware of limitations of the present stage of development.

Experience suggests two types of communications satellites as best for broadcasting systems: Satellites on synchronous equatorial orbits (see drawing page 29), such as Syncom 2, and satellites on stretched inclined elliptical orbits, providing long continuous transmission periods, such as Molniya 1. The problem now is to improve the power sources, stability, reliability and life of the equipment on board the satellite. The launching by the U.S.S.R. of a satellite equipped with an electrical battery with radioisotopes suggests one possible solution.

These are some of the advantages of the synchronous satellite :

- no time limit for transmission,
- a minimum number of satellites in orbit for global communication,
- comparatively simple construction of ground antenna, driving servomechanisms for the antenna and computer control devices,
- remoteness of satellites from the effects of belts of intensive cosmic radiation,
- stability of received signals,
- absence of distortion from Doppler effect,
- the "earth satellite" permits relative localization of the radiated wave, reducing interference between space and ground equipment.

Among the advantages of the high elliptical orbit are:

- an orbit which provides optimum receiving conditions for the ground stations of a given country or territory,
- use of the same satellite for programme exchange between territories in the eastern and western hemisphere with one-hop propagation,
- high signal to noise reception in the high latitudes where synchronous satellites do not provide good reception,
- simpler and more economic launching of satellites.

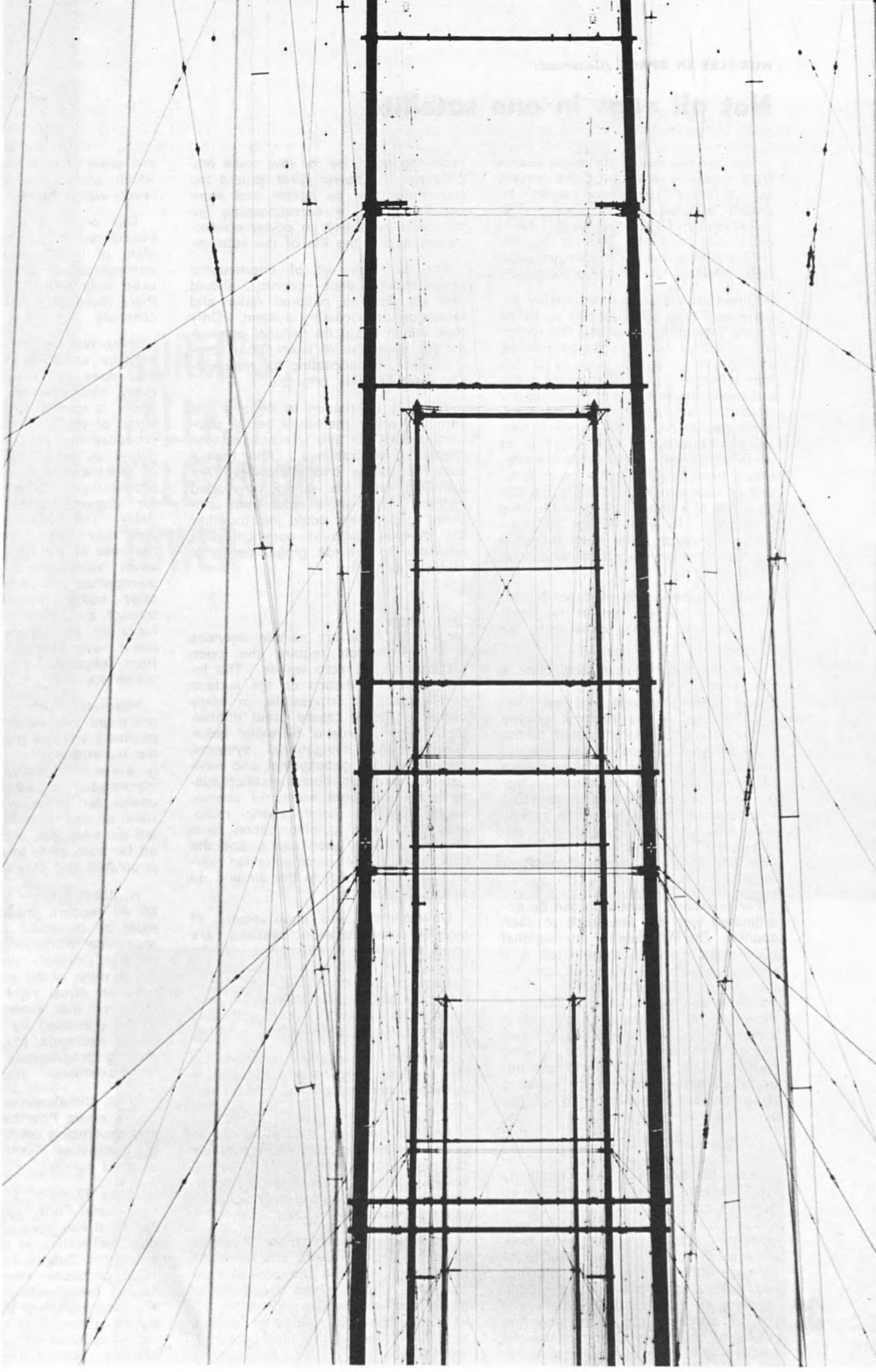
It is possible that, for global communication, a system combining both types of satellites will prove most satisfactory.

Direct broadcasting, which would provide a direct signal from the satellite transmitter to the ordinary home receiver, offers some apparent advantages. But the shortcomings are so numerous and important that it may have limited scope. However, on the positive side, it would not be necessary to load national and local broadcasting stations with transmissions from satellites, and the listeners and viewers would have a more varied choice of international programmes.

But there is an impressive list of obstacles to direct broadcasting. A high power supply would be necessary on the satellite, of an order not now technically available. Even if the power were available, it might not be practical to radiate it, since it would create interference with services such as fixed and mobile communication, and radar, which share frequency bands allocated for satellite communication.

CONTINUED ON PAGE 32

NICOLAI I. TCHISTIAKOV *is Professor of Radio Techniques at the Institute of Telecommunications in Moscow. He took part in the Unesco meeting on the use of space communication by the mass media, in December 1965.*



Television will be the biggest beneficiary from the revolution brought by communications satellites. Existing means of radio broadcasting are generally satisfactory and not costly. Right, transmitting antenna for world-wide broadcasting.

Photo © Aart Fotograaf Klein, Amsterdam

Not all eggs in one satellite

The optimal bands for transmission from satellites are centimetre waves, but ordinary receivers cannot be readily adapted to this band. The installation of a complicated and expensive receiving antenna by the ordinary set owner for proper reception from satellites is also not practical.

Direct broadcasting faces further difficulties. With synchronous satellites of the "stationary" variety, the reception becomes worse at the boundaries of the region served, mainly in the high latitudes. Signals from the satellite cannot be kept out of countries for which they are not intended. Transmissions cannot be shifted to more convenient times for the populations of given territories. The sound on a television transmission cannot be processed or changed if translation into the language of a given country or territory is desired. In areas where the television standards differ from those of the transmission, reception would be impossible.

Much further study of direct broadcasting will be required, in the event that countries reach agreements for its use.

Broadcasting with retranslation is the system in which television and sound broadcasts are received from the satellite by the national ground station and then retransmitted to the individual home receiver via national broadcasting stations. The advantages of this system are numerous. Programmes can be received on portable transistor radio and television receivers. Optimal frequencies in the "satellite-Earth" channel can be used, independent of the bands of ordinary receivers.

For television, standards can be co-ordinated with the standards in each country. The schedule for international broadcasts can be co-ordinated with national broadcast schedules and for the convenience of the people. Programmes can be recorded or taped at the receiving stations for broadcast at a more convenient time. Stable types of modulation and of signal processing can be used in the "Earth-satellite-Earth" channel for noise resisting reception and for narrowing of the occupied frequency band.

For broadcasting by retranslation by synchronous satellite, the ground station can be located at a comparatively low latitude where, for the given country, optimal reception conditions exist. In the use of satellites with elongated elliptical orbits, it is possible to switch from one satellite to another without programme interruption. Also, it is possible to reduce interference from satellite radiation to ground services by decreasing the power of the transmitter aboard the satellite, by using sharply directional receiving antennae, or low noise amplifiers. The power plant aboard the transmitter can be lighter and more compact, with a corresponding increase in reliability, in power conservation, and in the life of the satellite.

For the new art of international broadcasting, each country should first develop its national radio and television broadcasting system. Only then can it adapt its national network for the reception of international programmes. Broadcasting by retranslation best fits this principle.

There is no reason to believe that satellites will in the future be the principal means for the international exchange of programmes. Other means such as cables and micro-wave are available and are being developed further. Micro-wave links from continent to continent could join together the various national communication networks to provide global networks of large capacity.

There are certain services which require the open propagation of radio waves. The localization of radiation on the surface or in space is impossible, in some cases, or could create great difficulties. This is true of terrestial radiolocation and navigational systems, meteorological, geophysical and navigational satellites, communication systems for the flight safety of cosmonauts, planet radiolocation, radioastronomy and communication with observatories in open space, and the important mobile communication service on the ground, in the air and on oceans .

Development and improvement of mobile communication systems are important now and must go on in the future. Today there are systems for control of maritime, air, and other transport, and communications services for the passengers. More individual services will be required in the future.

Satellites especially launched for the purpose may have a great role in mobile maritime communication service.

And so we see that satellites in point-to-point communication systems may solve the problem of a global communication network. However, they do not give us the only solution, nor the most realistic one.

Satellite communication systems must be designed with limitations on their range and the duration of their use, with relation to the availability of other systems, and to economic advantage. This is my personal opinion, but I firmly believe that only by adhering to the principle can we exclude the crisis in the use of frequencies which arose in the high frequency (short wave) band.

This point of view must also be considered in planning the development of broadcasting. The satellite communication channels should be used only when actually necessary; there must be economy of frequency channels.

Immediate transmission is necessary only for actual important events, and that does not take much time nor many channels—on a global scale. There is usually a delay in transmissions of the principal parts of many broadcasting programmes, and the delay is often desirable because of zonal time differences. The processing of broadcast programmes for language differences requires a delay. The transcription of programmes may serve satisfactorily, as in the case of the 1964 Olympic Games, when television programmes were transported to Europe from the U.S.A. after being received from Tokyo through the satellite Synchron III and recorded on magnetic tape. They could have been transported directly from Tokyo to European central television stations.

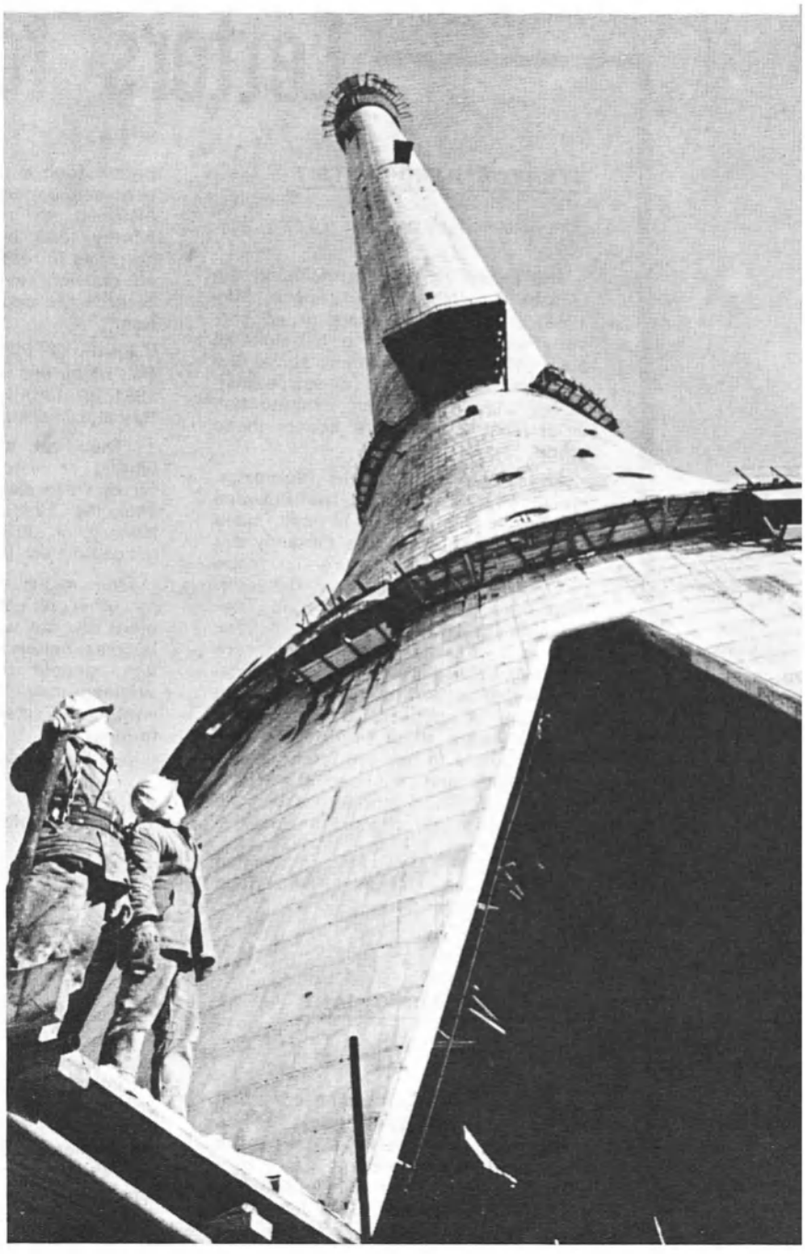
However, such considerations do not mean that satellite communication channels will not play a great role in the transmission of broadcasting programmes. Television programme transmission by satellite may be very useful for areas where the ground nets of multi-channel communication are not adequate, and for towns situated far from other towns across underpopulated and inaccessible territories.

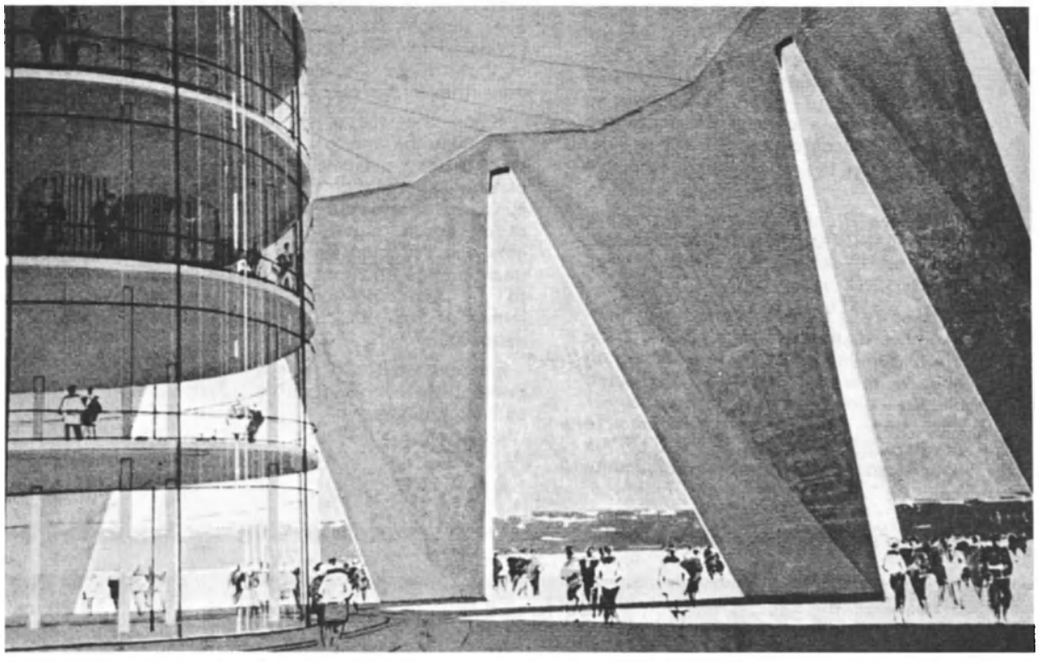
A global system combining the use of all modern means and methods must be designed, providing for approximate scheduling of the use of satellite channels, and it must secure for all parts of the world and all countries an equal right of participation. However, that enterprise would have to be preceded by a broad international exchange of television broadcasting programmes via communications satellites.

In a global exchange, there must be an equal flow between developed and developing countries. Each country possesses invaluable treasures of national culture.

Since October 5, 1957, when the man-made Earth satellite became a reality, it has been clear that all technical difficulties in this field may be overcome. But the regulation of major legal problems always goes slowly. Global broadcasting through communications satellites must be regulated by an international convention, based on the relevant decisions of the United Nations General Assembly.

WORLD'S TALLEST TELEVISION TOWER





A lofty tower is now thrusting skyward above Moscow (above right). It is already as tall as the Eiffel Tower in Paris, and when completed in the autumn of 1967, its 520 metres (1,700 ft.) will make it the highest edifice in the world. Antenna on its summit will boost direct television transmissions from Moscow, providing good quality reception, without additional relay transmission, for people living up to 150 kms. (90 miles) from the capital. Above, artist's sketch of the tower. Right, an impression of the base of the tower viewed from inside; giant concrete feet support the 26,000-ton structure.

Photos © APN

Letters to the Editor

STRATOSPHERONAUTS ?

Sir,

The press in general, including the Unesco Courier (Man in Space, May 1966) describes the score or so persons who have risen to a height of some 400 kms (250 miles) above the earth as "cosmonauts" (or astronauts). In my view this is an exaggeration or at least a premature use of these terms.

An altitude of 400 kms (approximately the length of Switzerland between its farthest frontiers) is still quite close to our planet; it is certainly not the cosmos. If we picture our globe as a circle 10 cm. (4 in.) in diameter, then in proportion our pseudo cosmonauts have risen a mere 4 mm. (1/6 in.). At that altitude they are still well within the earth's gravitational field which is why they have to orbit the globe at such colossal speeds.

It would be more appropriate and more accurate to use the term "stratospheronaut" and to keep the name "cosmonaut" for those who will actually reach the cosmos one day.

F.E. Ducommun
Geneva, Switzerland

THE FIRST HISTORIANS

Sir,

I am one of your genuine admirers, and enjoy each issue as it comes along, largely because it takes the whole world as its oyster. Once in a while, however, when it falls short of this ideal, I am critical. The June 1966 issue is one which provokes the comment below.

Miss Barbara Bray, in an interesting article on Ibn Khaldun (1332-1406), calls him "the first man to treat history as the proper object of a special science." But is this so? The Chinese for a millennium and a half before his time regarded the writing of history as a special province, and these historians conceived it their duty to dilate on the whole story of man's past.

Charles Sidney Gardner of Harvard (in *Chinese Traditional Historiography*, 1938, p. 16) writes thus about Ssu-ma Ch'ien (B.C. 100):

"History is to him no mere genealogical record, no bald archival chronicle of a single court, no treatise on political morality. Nor is it dedicated to the glory of any individual or institution. Rather it is a composite portrayal of the whole past of his people, so far as accessible documents permit such a record. Especially is it a golden opportunity for the judicious historian to render justice to the worthy, and by the fullness of his narrative to rescue them from threatened oblivion, even as he unflinchingly records the depths of human degradation."

Edwin G. Pulleyblank of Cambridge (in *Historians of China and Japan*, 1961, p. 136) writing of Chinese historical criticism, has this to say:

"The first actual treatise on the writing of history in Chinese (or, as far as I can discover, in any language) was the *Shih-t'ung* (Generalities on History) of Liu Chih-chi (A.D. 661-721) ... completed in 710."

One might add similar comments by other objective scholars. Fortunately, as the writings of the Chinese become better known through translation, people unacquainted with the original may themselves judge the worth and standards of these historians.

L. Carrington Goodrich
Dean Lung Professor
Emeritus of Chinese
Columbia University, New York

GHOSTLY POLYGONS IN SPACE

Sir,

I would like to suggest a different explanation for the "ghostly polygons of light" that featured on the front page photograph of the May 1966 issue of the Unesco Courier, as taken from the Soviet spacecraft Voskhod I, and that were ascribed to "rays of sunlight reflected on the spacecraft window."

I have recently had a similar experience with photographs that were not taken through a window.

I happened to take some photographs at a small angle toward the sun, though the sun never actually appeared in the photos, and in some of these there are one or two pentagons (never more).

Since the shape of the polygons resembles the aperture in the camera's diaphragm, I assume that the cause of this phenomenon is due to the sun rays passing through the aperture at a certain angle, hitting the inner lens and reflected (totally or partially) back outside, then once again reflected to the film from one of the outer lenses (size and brightness thus defined).

The camera I used was a Contaflex-prima. My explanation is just an assumption.

Ariel Einat
Tel-Aviv, Israel

WHY NOT USE SEA WATER ?

Sir,

With many regions facing water shortages, available supplies of fresh water must be used economically. While scientists are searching for the best way to desalt sea water (probably with chemical substances) there are many ways of using sea water as a substitute for fresh. Swimming pools which take enormous amounts of fresh water—to which salt is often added—could be filled with sea water. And what about industry? Iron and steel plants absorb vast quantities of fresh water to which sodium chloride is often added. In its manufacturing processes the plastics industry uses hundreds of millions of litres of fresh water and almost as much salt. Why waste so much drinking water on other needs when to use sea water would be both an economy and a simple solution. Its distribution would cost no more than the present collection and supply of fresh water.

I should like to add my compliments to the many you have already received for your remarkable issue on "Water and Life" (July-August, 1964).

E. Thumelaire
Brussels, Belgium

MAGIC WORLD OF PUPPETS

Sir,

May I say how much my family and I enjoy your magazine, especially the recent articles on art. The standard of the colour photography in the December 1965 issue was excellent.

I lent several copies of the Courier to friends hoping that they would become subscribers. Unfortunately their home was one of many destroyed by bushfires last year and the copies of the magazine were destroyed along with the rest of their belongings. I list the copies that were lost and I wish to know if I can replace them.

Many years ago the Courier devoted an issue to puppetry (Puppets: Magic World in Miniature, No 3-4, 1955). Would it be possible to produce another issue on this subject? I feel that the increase in subscribers over the years means that many will not have had the pleasure of seeing this or a similar issue.

W.J. Shaw
Diamond Creek
Victoria, Australia

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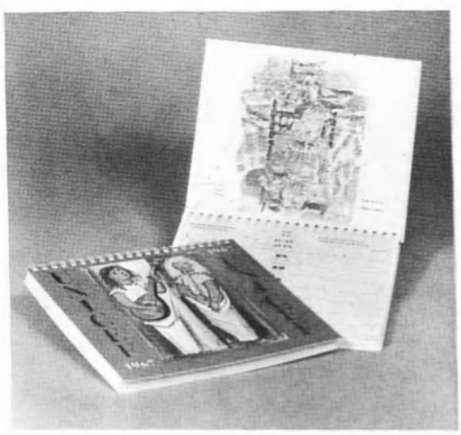

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